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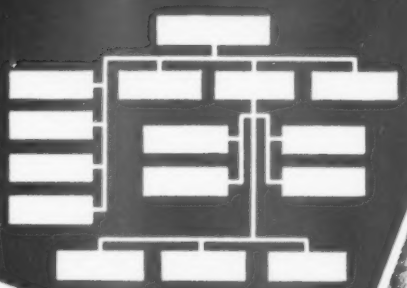
FACTORY

MANAGEMENT AND MAINTENANCE

FEBRUARY 1953



Decentralization: One Cure for Production Headaches

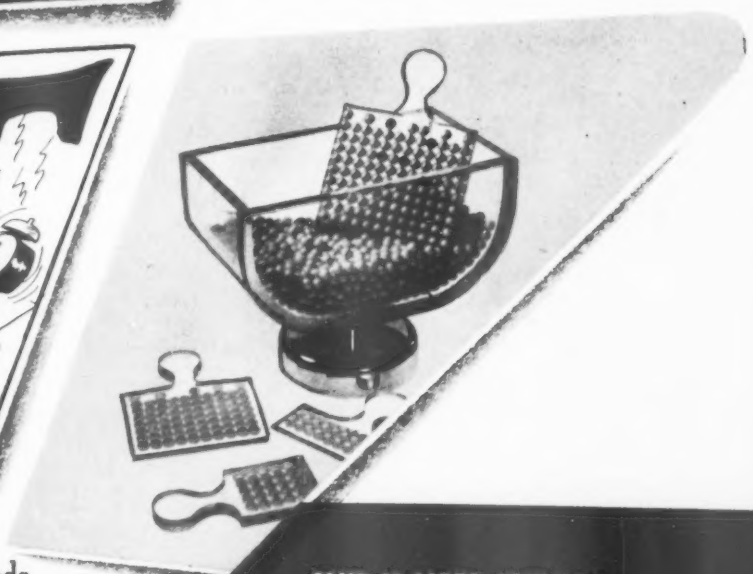
Four "little factories" make managing easier. Page 104.

Cut New-Worker Accidents 78%

New ways to make the same old safety story sing. Page 98.

You Can Use Your Time Better

More results for your time — and more time for results. Page 84.



Make Statistical Methods Easier to Understand

Try gadgets. They help. Here are five you can use. Page 92.

PLUS 22 MORE ARTICLES
AND 17 REGULAR DEPARTMENTS
COMPLETE CONTENTS, PAGE 2

preference points on power transmission units

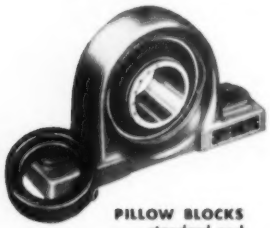
Not one but two GREASE PORTS!

A Two grease ports . . . 180° apart.

B Never more than 90° from lubrication fitting.

If you select power transmission units with re-lubrication in mind, you'll appreciate the importance of the Fafnir two-grease-port design to dependable ball bearing performance. There is always one grease port in the bearings' outer ring that is never more than 90° from the lubrication fitting . . . and this fitting, incidentally, can be your own type because Fafnir provides standard pipe plugs.

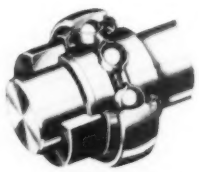
Point by point comparisons of design features, from the Fafnir-originated wide inner ring ball bearing with self-locking collar . . . easiest of all to install . . . to the frictionless Mechani-Seals . . . explains the steadily-growing preference for Fafnir Ball Bearing Power Transmission Units. For details, call your nearby Fafnir distributor. The Fafnir Bearing Company, New Britain, Conn.



PILLOW BLOCKS
. . . standard and heavy series

FLANGE CARTRIDGES
. . . standard and heavy series

CYLINDRICAL CARTRIDGES
. . . standard and heavy series



WIDE INNER RING BALL BEARINGS
. . . with Mechani-Seals

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Where failures meant shutdowns they changed to grommet belts

B. F. Goodrich grommet V belts last 20 to 50% longer

Crushing rock puts terrific shock loads on the V belts that drive the crusher. When the drive stops because of premature belt failure, the whole operation shuts down, deliveries are delayed. The stone company wanted reliability—and got it—when a set of B. F. Goodrich grommet V belts was installed. In spite of the shaking, jolting action, the grommet V belts on this crusher have already given two years of trouble-free service, and are still in excellent condition. Here's why B. F. Goodrich grommet V belts outlast and outperform ordinary belts.

No cord ends

A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength

All of the cord material in a B. F. Goodrich grommet belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. There are no layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced. And grommet V belts stretch less—only ⅓ as much, on an average, as ordinary V belts.

Better grip, less slip

Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

They cost no more

Grommet V belts cut costs because they last longer, increase production because machines keep running with fewer interruptions, reduce maintenance costs because they need less attention, yet they cost not one cent more. Available in C, D and E sections. But remember, only B. F. Goodrich makes the grommet V belt (U. S. Patent No. 2,233,294), so to get all these savings, call in your local BFG distributor the next time you need V belts, or write *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.* (Available in Canada)

Grommet V-Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

FACTORY
MANAGEMENT AND MAINTENANCE

COMPLETE CONTENTS • FEBRUARY 1953 • STARRED ITEMS

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FOR 62 YEARS

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ARE HIGHLIGHTED HERE

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COMING IN MARCH

WE ALWAYS THINK TWICE before we say such-and-such an article by so-and-so is "a significant contribution to current management literature." We're saying it about Harold E. Bliss's description of a program that is knocking a third off Lukens Steel Company's maintenance bill . . . **ALSO IN MARCH,** how Minneapolis-Honeywell's Micro Division found another cure for briefcase-itis; 26 key executives learned to read faster and better right in the plant . . . **AND DON'T MISS** Carroll W. Boyce's definitive article on **ULTRASONICS.**

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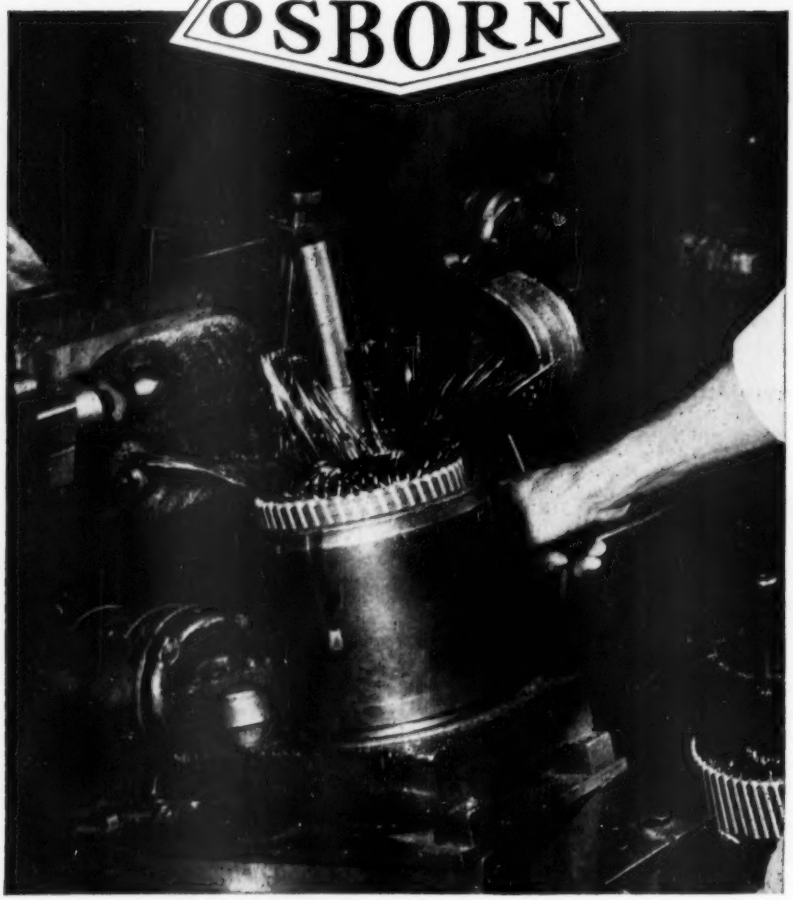


How to make parts come clean . . . at the push of a button

It takes only 8 seconds to remove the enamel insulation from the entire bunch of a motor's coil leads with the set-up shown above. This stripping, preparatory to soldering, is done with Osborn power brushing . . . automatically . . . at the push of a button.

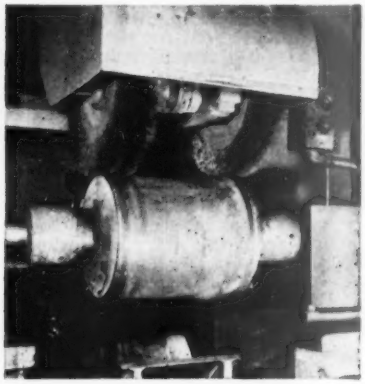
Wire stripping is typical of thousands of cleaning operations throughout Industry which have been simplified and speeded by Osborn Power Brushes. Your **O**sborn **B**rushing **A**nalyst is experienced in finding solutions to cleaning and finishing problems of all kinds.

His service is backed by the extensive engineering facilities of Osborn, to devise brushing methods and special machines *to help you.* There is no obligation. Call today or write *The Osborn Manufacturing Company, Dept. H-2, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

OFF COMES RUST. These two counter-rotating Osborn Master® Wire Wheel Brushes, powered by 1½ h.p. motors, clean rust and scale from 2-inch pipe preparatory to fabrication. Cleans 15-feet of pipe per minute . . . at the push of a button.



OFF COMES SLAG. It takes only 40 seconds for these Osborn Wire Wheel Brushes to whisk away all slag and scale from both end welds of compressor heads . . . at the push of a button.

OFF COMES FLASH. Removal of rubber flash of rubber-to-steel joints of army tank track shoes is simply a matter of sliding the shoes across the face of an Osborn Disc-Center* Wire Wheel Brush. A mass production operation . . . at the push of a button.

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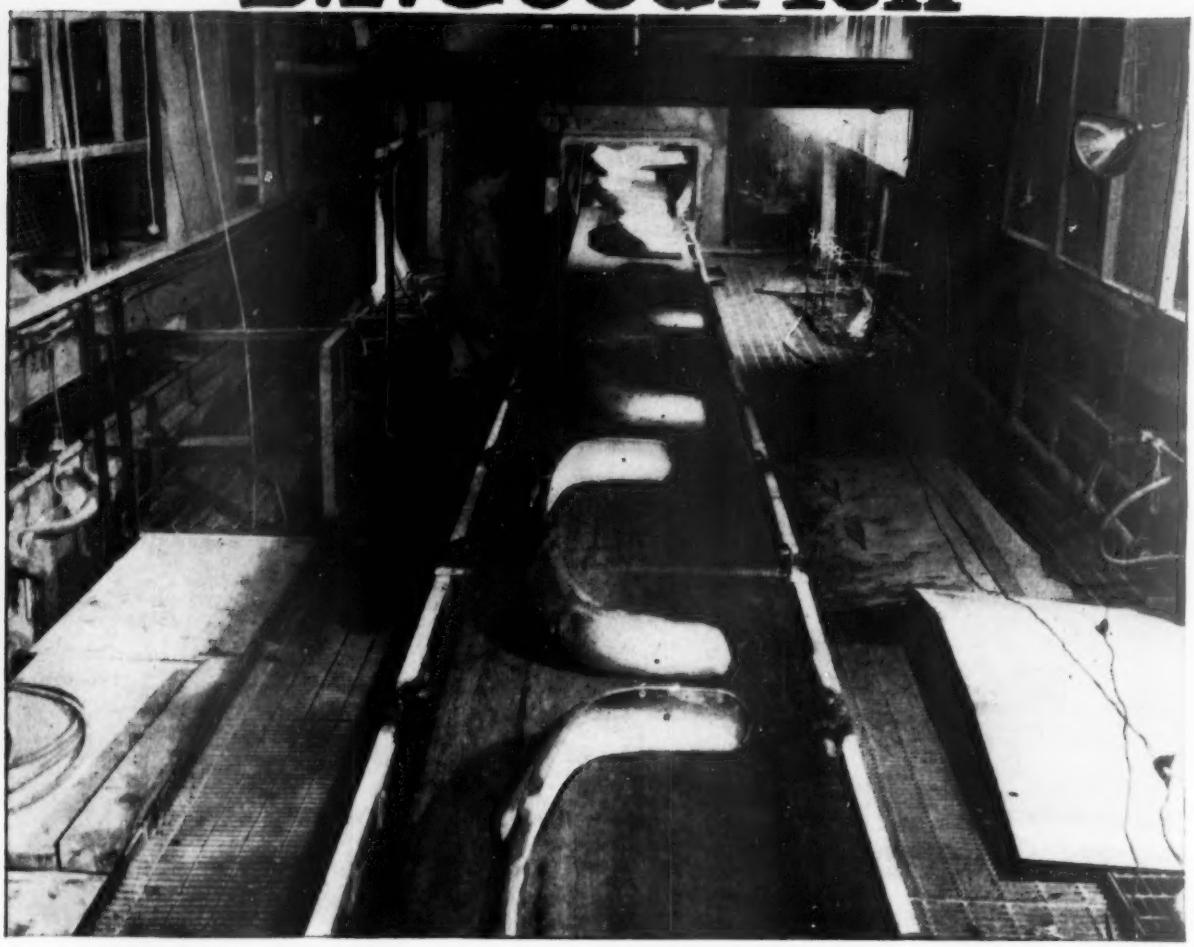
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Rubber highway for bumper-to-bumper traffic

A typical example of B. F. Goodrich product improvement

THOSE curved pieces of steel will soon be gleaming bumpers on new automobiles. But until they are trimmed and polished, they're rough riders on conveyor belts. The plant was using belts without rubber covers, but the sharp, jagged edges of steel used to chew them to pieces in 3 months. And each time a belt gave way in the half mile long "highway", the plant had a traffic jam. That meant a lot of bumpers were late.

Then a B. F. Goodrich man suggested replacing these short-lived belts with an improved rubber belt made by B. F. Goodrich. This belt is built with a tough rubber cover that resists cuts and gouges. And because the belt has this cover on both sides, it can be turned over when one side becomes worn and used for months more.

The B. F. Goodrich belt was installed, has already lasted over a year in round-the-clock service—4 times longer than the uncovered belts previously used. This BFG belt not only saved the cost of 3 replacements but also has saved the cost of lost production during shutdowns.

So whether it's heavy pieces of steel you want to move, or any kind of material—rock, sand, coal, hot coke, ice, lime, potash, or just plain packages—B. F. Goodrich has made improvements in conveyor belting that can save you money. All kinds of industrial products, including hose, transmission belts, V belts, have been made better through BFG research. That's why you're sure of better values in rubber when you call in your BFG distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

■ Composite photo showing a drum of chemicals being put through a variety of handling motions by the Baker "Octopus."

THE BAKER-RAULANG CO. 1853 100th 1953 THE BAKER-RAULANG CO.

This BAKER TRUCK handles any shape load...

and stacks it in any position!

■ You name the load—the Baker "Octopus" illustrated will handle it, whether it's a drum, a roll of newsprint, a packing case, a piece of machinery, a bale of cotton or a pallet load of cartons. Moreover, it will pick it up, transport it, raise or lower it, shift it to left or right, revolve it, up-end it, or stack it in any position. In fact, it will handle it with no more physical effort than is needed to operate the simple hydraulic controls.

The "Octopus" consists of a standard Baker Fork Truck equipped with a variety of Baker attachments—360° revolving head, 4-purpose carriage, up-ender, drum clamp, etc.—which may be applied individually or in combinations. While one truck may never be called on to perform all these functions, the "Octopus" demonstrates the range of utility of Baker fork trucks and attachments.

Baker

industrial trucks

write for 6-page special report on the application of Baker attachments to various loads.

THE BAKER-RAULANG COMPANY
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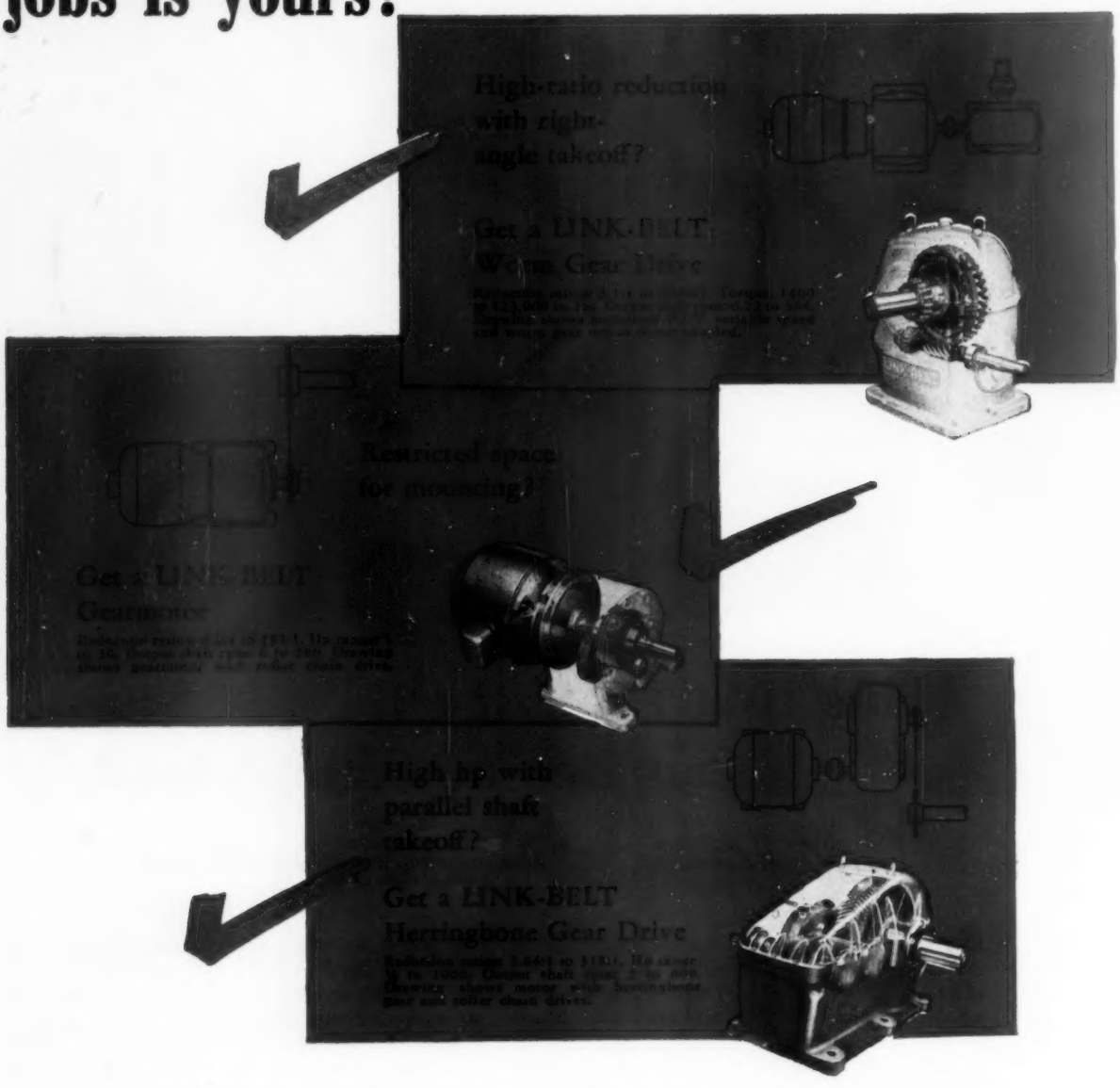
BAKER-LULL Corporation, *Subsidiary*, Minneapolis, Minn.
Material Handling and Construction Equipment.

Which of these speed reduction jobs is yours?


High-ratio reduction with right-angle takeoff?
Get a LINK-BELT Worm Gear Drive
Restricted space for mounting?
Get a LINK-BELT Gearmotor
High hp with parallel shaft takeoff?
Get a LINK-BELT Herringbone Gear Drive

Yes, LINK-BELT builds all 3

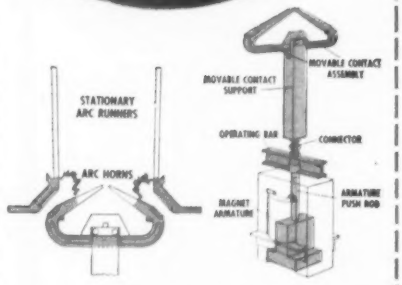
NO LONGER need speed reduction be the limiting factor in a design or application problem. Because no *one* speed reducer solves every reduction problem, Link-Belt builds all three—Helical, Herringbone and Worm. Now it is only necessary to choose the right type of Link-Belt enclosed gear drive . . . and select the hp and reduction ratio that fit your requirements. You can get complete engineering information from the Link-Belt office near you.

ALLIS-CHALMERS

TYPE 256

Air Contactors

CUT Maintenance Cost



Double-break contacts, vertical action, dual blowout structure and other features speed arc extinction . . . assure long life and low maintenance.

IF YOUR OPERATION demands frequent starting, inching, reversing or plugging . . . if rough repetitive duty plays havoc with contacts and sends maintenance costs skyrocketing . . . you need the Allis-Chalmers Type 256 Air Contactor.

No Turning Shafts — No Shaft Bearings

The elimination of turning shafts, shaft bearings and flexible contact leads minimizes mechanical wear. Double-break contacts of arc resistant alloys, *operating in air,* straightline vertical action and fast arc extinction add months of contact wear. Actual case histories of "once-a-minute interruption" duty have revealed little contact wear in a full year's operation.

Replacement Units

Compact design permits installation in a cubicle used for oil immersed units in existing starters. And, of course, the Type 256 Air Contactor is also available in Allis-Chalmers Type H Starters.

Call your nearby A-C representative or write for Bulletins 14B7303 and 14B6410. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3945

ALLIS-CHALMERS

FOR CLASSY SHOPS

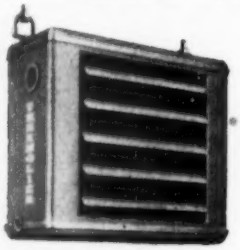
. . . OR BUSY PLANTS

THERMOLIER UNIT HEATERS

The condensed table below is a quick guide to the selection of the correct Thermolier for specific conditions. The capacities, when motors are operating at normal speeds, are based on Standard Basis of Rating: 2 lb. steam pressure and 60° F entering air temperature. Grinnell Thermoliers are tested and they are rated in strict accordance with rules of the Industrial Unit Heaters Association.

All Thermoliers can be operated at working steam pressures up to 125 psi and steam temp. up to 406° F.

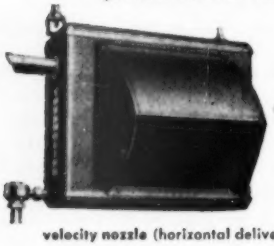
A MODEL AND SIZE FOR EVERY PURPOSE



horizontal delivery

textile (horizontal delivery)

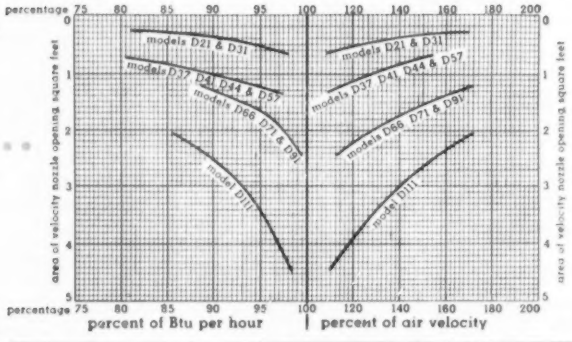
vertical delivery



velocity nozzle (horizontal delivery)

model	total heat delivered, Btu per hr	sq ft edr (nominal)	air velocity at exit, louvers open, lin. ft. per min.
horizontal delivery			
D21	35,600	148	786
D31	48,700	203	851
D37	62,200	259	753
D41	71,000	295	901
D44	84,100	350	887
D57	101,300	422	1016
D66	128,700	536	779
D71	151,700	632	977
D91	196,000	817	985
D111	275,300	1147	1048
Textile			
TX70	69,800	291	826
TX110	113,700	474	877
vertical delivery			
VA1042	50,800	212	1399
VA1045	73,600	307	1287
VA1065	109,400	456	1354
VA1075	145,600	607	1231
VA1101	185,000	770	1495
VA1111	257,000	1071	1631

performance with velocity nozzle ▶


percentage 75 80 85 90 95 100 120 140 160 180 200
models D21 & D31
models D37 D41 D44 & D57
models D66 D71 & D91
model D111
area of velocity nozzle opening square feet
0 1 2 3 4 5
percent of Btu per hour
percent of air velocity

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THERMOLIER UNIT HEATERS

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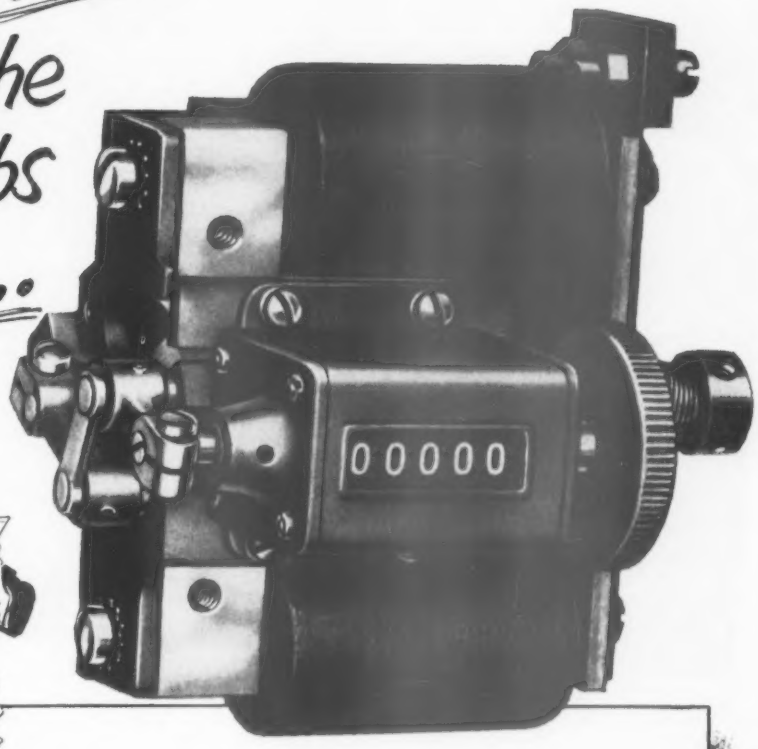
Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems

This Electrical Reporter Stays on the Tough Jobs Longer...



Added Evidence that

Everyone Can Count on VEEDER-ROOT

Compact and rugged . . . this electrically operated reset counter is specially designed for tough jobs that demand longer counter life.

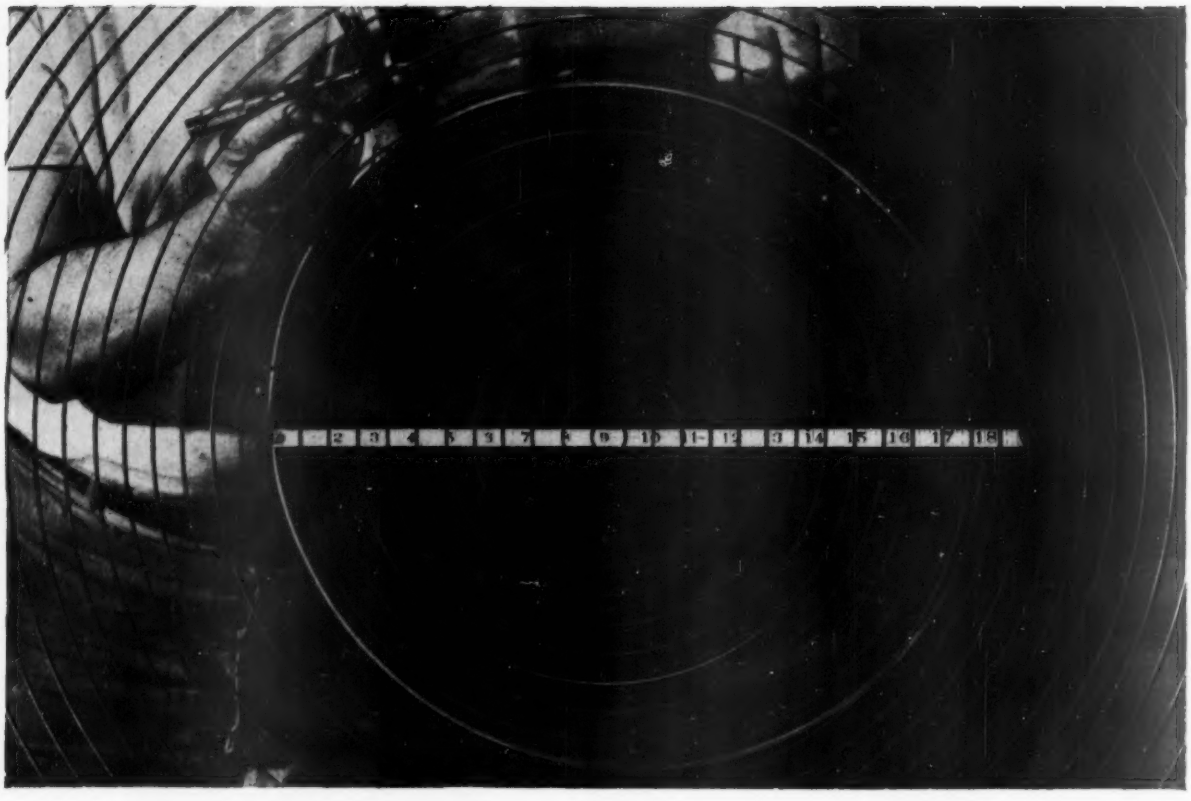
Here's another instance of the *infinite applicability* of Veeder-Root *Count*rol — electrical, mechanical or manual. And here's another instance, too, of the endless resourcefulness of Veeder-Root engineering, and the ability to design a *complete counting package* that fits the job fully and exactly. Now . . . what's *your* problem?

VEEDER-ROOT INCORPORATED

"The Name That Counts"

HARTFORD 2, CONNECTICUT

Chicago 6, Ill. • New York 19, N.Y. • Greenville, S.C.
Montreal 2, Canada • Dundee, Scotland
Offices and Agents in Principal Cities



from 1/8" *to* 40" **OD**

WHEN YOU NEED STAINLESS STEEL TUBING

TRENTWELD *will meet your needs best*

Name an industrial application that calls for stainless steel tubing — and the tubing to name is TRENTWELD. Available in diameters from 1/8" to 40" OD TRENTWELD presents a broad range of grades, gauges and finishes.

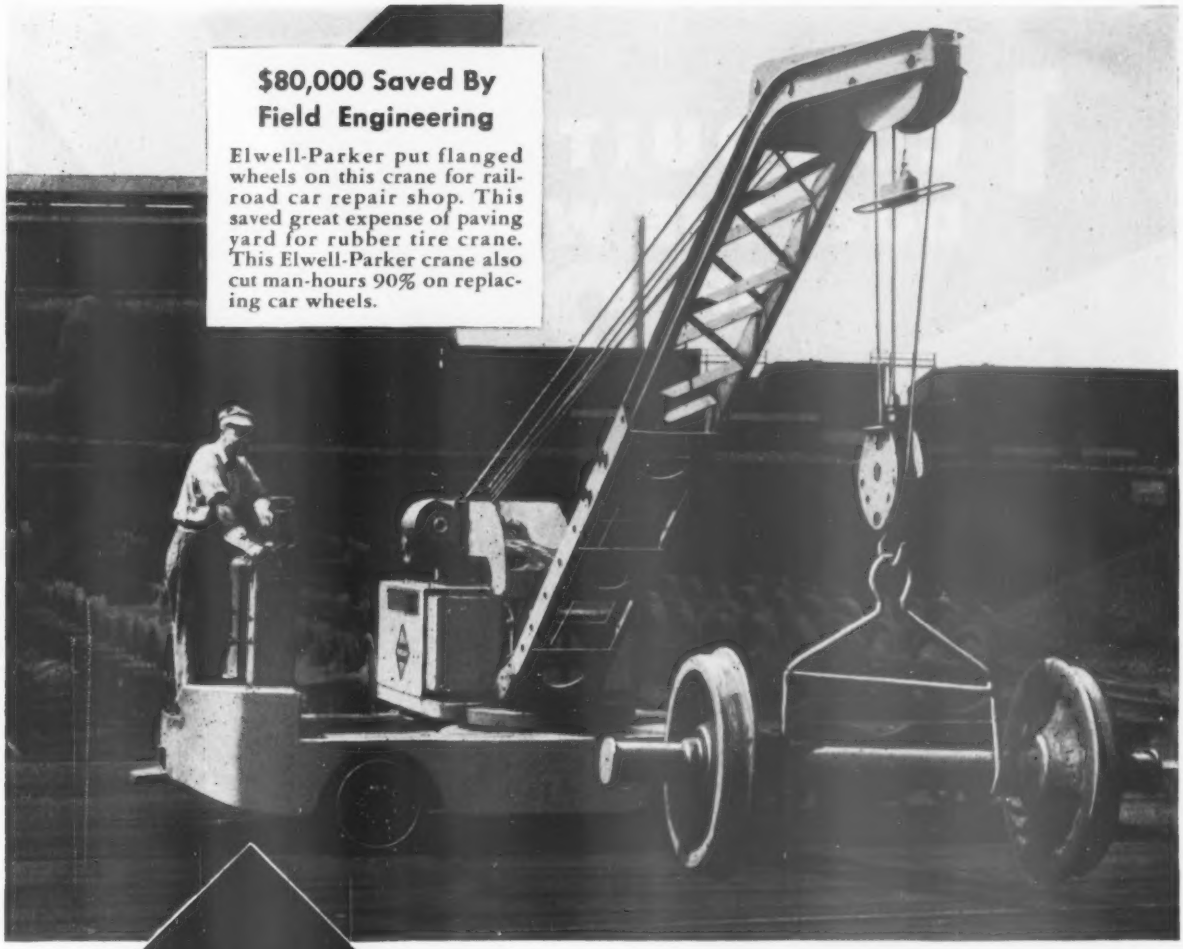
Study the product and the plant where it is produced and you find the reason for the steady increase in TRENTWELD usage. For TRENTWELD is made in a *tube* mill by *tube* experts who roll and weld stainless and high alloy tubing without added rod metal. This Trent method results in metallurgically correct tubing with a uniform section and uniform corrosion resistance.

No matter how specialized your tubing needs may be, you will find there's a TRENTWELD tubing to meet your most exacting requirements. To call in Trent is to put our experience at your disposal. Write us full details of your most pressing problem involving stainless or high alloy tubing.

TRENTWELD

STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)



$80,000 Saved By Field Engineering

Elwell-Parker put flanged wheels on this crane for railroad car repair shop. This saved great expense of paving yard for rubber tire crane. This Elwell-Parker crane also cut man-hours 90% on replacing car wheels.

ELWELL-PARKER

truck installations are *Field Engineered* to your needs

Buyers of Elwell-Parkers get far more than just a quality truck. One of many plus values is a personal analysis of their material handling needs by an E-P Field Engineer. There are 40 of these E-P men, resident in all principal cities. The average experience of these truck specialists exceeds fifteen years . . . behind them is Elwell-Parker's unmatched, 47 years of truck know-how.

E-P Field Engineers can help you select exactly the right truck from the complete line of Elwell-Parker high and low lift platform trucks, fork trucks, or mobile cranes. To solve your individual handling problem, they will work closely with you to design a special or modified truck.

E-P Field Engineered installations insure the best possible truck performance at no extra cost.

Learn about all the other Plus Features of Elwell-Parkers by writing for this General Catalog. The Elwell-Parker Electric Co., 4021 St. Clair Ave., Cleveland 3, Ohio.

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893

1 CONDUIT DOES THE WORK OF 2

WITH ROCKBESTOS PNR CONTROL CABLE

Because Rockbestos PNR is approximately ½ the size of competitive control cable, you pull 12 conductor PNR in one conduit where before you had to use two conduits or double diameter conduit to carry the same amount of cable.

Result — one conduit carries almost twice its former electrical load. You save steel conduit and fittings . . . and cut installation costs.

Get the complete PNR story, today. Write or ask your nearest Rockbestos representative.

PERMANENTLY INSULATED ROCKBESTOS WIRES AND CABLES

QUICK FACTS ABOUT PNR

46% smaller area* . . . 28% smaller diameters*. Use smaller conduit and fittings or put more conductors in present conduit.

Dielectric breakdown . . . over 40 times operating voltage.

Lighter and smaller. Easier to handle, store, ship, pull through conduit.

Flexible to — 25° C (–13° F). No cracking!

Rated 600 volts . . . conductor operating temperature 75° C (168° F).

*Average, determined by comparison with competitive control cable.

ROCKBESTOS

PRODUCTS CORPORATION
NEW HAVEN 4, CONNECTICUT
NEW YORK • CLEVELAND • DETROIT • CHICAGO
PITTSBURGH • ST. LOUIS • LOS ANGELES
OAKLAND, CALIFORNIA • NEW ORLEANS • SEATTLE

Orange Core

outperforms all other standard tapes

Orange Core is faster acting and stronger than you ever dreamed possible in a standard gummed tape!

Thanks to an exclusive Hudson process called *Supple-izing**, the Orange Core adhesive has a phenomenal performance. A multitude of tiny cracks in the adhesive drink up water, so that Orange Core is ready to take hold of cartons with a bulldog grip the very instant you pull it from the dispenser. There is no excessive curl to fight.

What's more, every step in Orange Core's manufacture is controlled by one management. There are no irksome variations in performance. Your shipping dollar will go further with Orange Core. Try this superb standard tape for a month and see the improvement for yourself!

** Copyright*

Did you know?

Only gummed tape gives such protection against pilferage

Only by using gummed tape can you seal cartons *with your company name imprinted on the seal.* Petty thieves cannot pilfer without being detected, for they are unable to replace your exclusive tape. The tape warns your consignee not to accept the carton if its seal is broken. You don't risk blame for careless count when your shipment has actually been pilfered.

Gummed tape gives your merchandise better protection in transit, too. It seals out smoke, dust, moisture, and vermin. It adds reinforcement to your cartons where most needed: at corners and seams. Because tape is a flexible closure, it helps your cartons better to withstand shock.

You build good will when you deliver goods protected against pilferage and damage claims with *gummed tape!*

Remember, too, only gummed tape sells as it safeguards your product, by displaying your imprinted messages.

Send for this helpful folder—TODAY!

"HOW TO MAKE YOUR SHIPPING DOLLARS GO FURTHER"

HUDSON PULP & PAPER CORP.
Dept. 46, 505 Park Ave., New York 22, N.Y.

I want my free copy of your informative folder,
"How to make your shipping dollars go further"

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COMPANY _____

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ORANGE CORE
CONSISTENTLY SUPERIOR

The world's largest selling gummed tape

HUDSON PULP & PAPER CORP.
Dept. 46, 505 Park Ave., New York 22, N.Y.

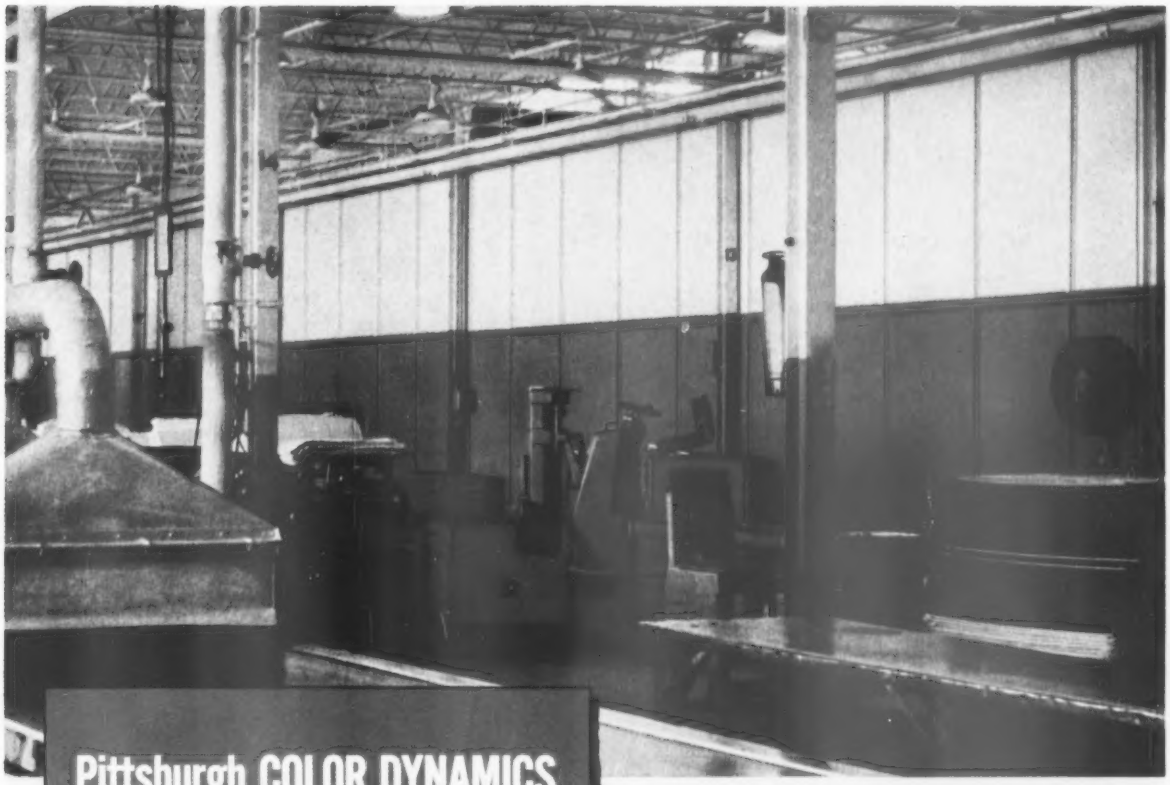
"Built Stronger To Burn Longer"

Designed specifically for commercial and industrial use . . . built ruggedly for long-life . . . Duro-Test lamps cut lighting costs . . . increase lighting efficiency.

For better light, longer life, fewer replacements, and lower maintenance costs write today for complete information.

DURO-TEST CORPORATION

North Bergen, New Jersey



Pittsburgh COLOR DYNAMICS

benefits both workers and management

of BRIGGS MANUFACTURING COMPANY

World's largest independent builder of automobile bodies puts color to work in plastics division to make working conditions more cheerful and pleasant.

ACTUAL experiences in a wide variety of industries continue to contribute more and more proof that Pittsburgh COLOR DYNAMICS helps both management and workers.

● **This modern system** which *puts color to work* increases production efficiency, improves working conditions, simplifies housekeeping and reduces time-loss accidents.

● **Typical of these benefits** are the results reported by the plastics and aircraft divisions of The Briggs Manufacturing Company of Detroit, Michigan. This vast organization is the largest independent builder of automobile bodies. It also manufactures Briggs Beautyware plumbing supplies and parts for military planes.

● **"COLOR DYNAMICS** has given us plant areas of which we are very proud," comments W. O. "Spike" Briggs, Jr., executive vice-president of The Briggs Manufacturing Company. "It has made our plastics and aircraft divisions attractive and colorful places that have improved both the efficiency and morale of employees. Our workers are actually so proud of their surroundings that they are constantly striving to keep them spotless, thus simplifying our housekeeping."

● **In COLOR DYNAMICS** Pittsburgh color experts and technicians have developed a set of principles which make it easy to select the right colors for every purpose. *Focal* and *eye-rest* colors lessen eye fatigue. *Morale-building* colors prevent mental depression. *Safety* colors guard against dangerous accidents.

● **Thousands of plants** have increased efficiency through Pittsburgh COLOR DYNAMICS. *Your* plant needs it too. So why not test its value by using this system of color selection next time you paint—either on a machine or two or throughout a department—and see the difference it makes?

Here's How to Get a COLOR DYNAMICS Engineering Study—FREE!

● We'll be glad to mail you *free* copy of our completely illustrated brochure on COLOR DYNAMICS for industry. It explains this painting system and how to apply it effectively on walls, ceilings, floors, machines and mobile equipment. Better still, we'll gladly submit a color engineering study of your plant, or any part of it, without cost or obligation. Call your nearest Pittsburgh Plate Glass Company branch and arrange to have our representative see you at your convenience. Or mail this coupon.

SEND FOR A COPY OF THIS BOOK

Pittsburgh Plate Glass Co., Paint Div., Dept. F-23, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your Booklet *"Color Dynamics."*

☐ Please have your representative call for a Color Dynamics Survey without obligation on our part.

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PITTSBURGH PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

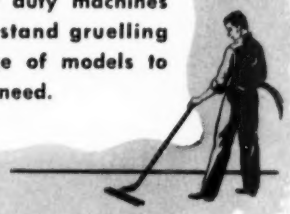
INVINCIBLE

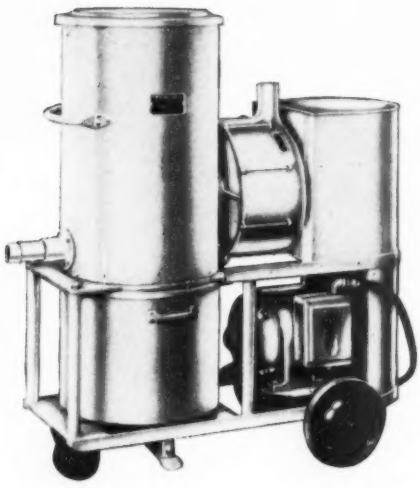
Vacuum Cleaners help keep plants Clean, Safe, Productive

Regardless of your business, dust and dirt in your plant can be removed quickly, thoroughly and at least over-all cost with Invincible Vacuum Cleaners . . . And a clean plant produces healthful and efficient working conditions.

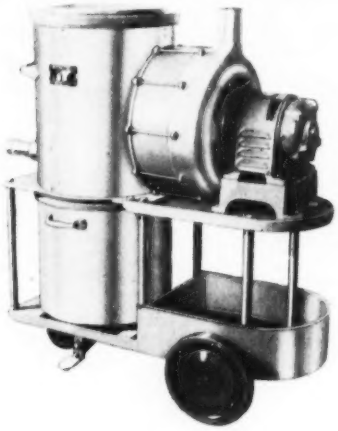
Invincibles are also contributing mightily to industrial progress by removing or reclaiming scores of industrial materials other than dust and dirt.

These portable heavy duty machines are designed to withstand gruelling service. A wide range of models to meet every industrial need.

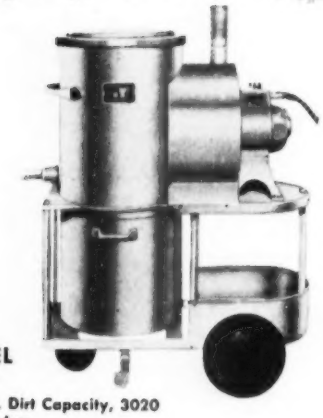




MODEL 809-B—5 H.P. Dirt Capacity, 3 cubic feet.



MODEL 460—1½ H.P Dirt Capacity, 3020 cubic inches.



MODEL 450

1½ H.P. Dirt Capacity, 3020 cubic inches.

SEND FOR BOOKLET— It tells —

- . . . About the 100,000 Invincibles now in service
- . . . About our 40 years experience in this field
- . . . How Invincibles clean every spot in the plant
- . . . About the many materials reclaimed or removed

ALL SERVICE

½ H.P. Both Wet and Dry Recovery

INVINCIBLE

Vacuum Cleaner Mfg. Co.

Dover, Ohio

$12.65 on the shelf... $32.45 in the line

Like most installations, a pipe line is part materials and part labor. And the labor part has been getting bigger and bigger.

This growing labor cost is no small consideration when buying piping equipment. It costs just as much to install an inferior valve as a good one. And it costs a lot more to service the inferior one. For a single item, that difference might not be significant. But single items don't make a piping system. Instead, you may use and have to maintain hundreds, even thousands of individual valves.

Simple arithmetic tells why today it's more important than ever to buy valves that last longer and need fewer repairs. That's why Crane quality makes Crane the line for the thrifty buyer...it's why more Crane Valves are in use than any other make.

Crane Co., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*

CRANE

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Here's ONE cost-cutting frontier still open to industry

At this loading dock, Link-Belt TRUCK-TOW Conveyor pulls 32 four-wheel trucks at a time . . . moves up to 1,500,000 lbs. daily. Big trailers are completely loaded in as little as 30 minutes.

Link-Belt TRUCK-TOW Conveyors offer dramatic savings for almost every plant

SHIPPING and receiving . . . department to department . . . in and out of storage. In fact, wherever packaged or bulky items are moved along a regular route by floor trucks—Link-Belt TRUCK-TOW Conveyors can slash your handling costs.

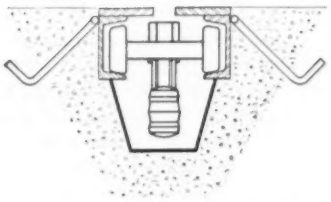
Either overhead or under-the-floor type, TRUCK-TOW provides faster, safer handling. Rehandling is eliminated. Damage, loss, split shipments and errors are minimized.

There may be spots in your plant where conflicting traffic causes confusion . . . where scarce, valuable manpower is being wasted in carrying or pushing. If so, a call to your nearest Link-Belt office will put you in touch with a materials handling engineer. He'll be glad to show you how flexible, low-cost TRUCK-TOW can save money for you. There is no obligation, of course.

LINK-BELT

TRUCK-TOW CONVEYORS

FLOOR TYPE TRUCK-TOW CONVEYOR OFFERS ADVANCED-DESIGN FEATURES



Especially popular where overhead structures interfere with fork-lift truck operation is the Floor Type TRUCK-TOW. All moving parts are below the floor.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities. 12,738

...with Barreled Sunlight Paint

Look at the price tag of a gallon of Barreled Sunlight Paint. You might find that it costs a few more pennies. But don't be fooled by that price. Those few extra pennies represent exclusive processing of costly ingredients that means savings . . . *big* savings . . . in your maintenance painting costs.

To begin with, Barreled Sunlight is so heavy in body you can add as much as a full gallon of thinner to every five gallons of paint. You buy less paint. You pay less for materials to do the job you want. But, of far greater importance . . . inasmuch as labor represents 80% of the total cost of a painting job . . . Barreled Sunlight has the spreading capacity, the hiding power, the free, fast flow that means a quicker job, a better job . . . a job that cuts labor costs.

Test it. Compare it . . . with any other paint . . . on your wall. You'll find that Barreled Sunlight saves more in the long run than any other paint.

BARRELED SUNLIGHT PAINT COMPANY
2-B Dudley St., Providence, R. I.

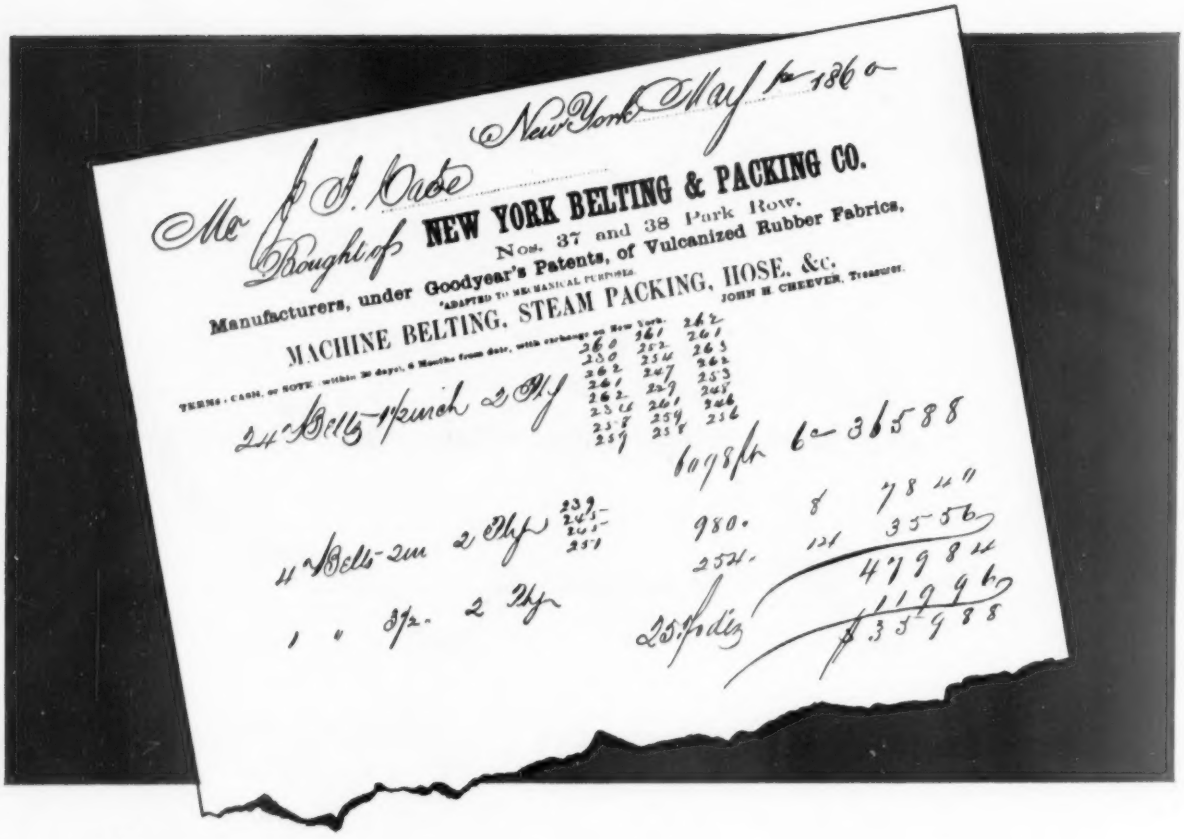
SEND FOR THIS NEW CATALOG NOW . . . For full information on all Barreled Sunlight Maintenance Finishes . . . as well as Barreled Sunlight's new and advanced "Engineered Color" Plan . . . write today on your company letterhead for this new Barreled Sunlight Catalog. No charge. No obligation.

Barreled Sunlight® Paints

In whitest white or clean, clear, wanted colors, there's a Barreled Sunlight Paint for every job

For over half a century those who know the best in paints . . . for all types of buildings . . . have strongly insisted on famous Barreled Sunlight

In the year 1860


New York May 1st 1860
Mr J. I. Case
Bought of NEW YORK BELTING & PACKING CO.
Nos. 37 and 38 Park Row.
Manufacturers, under Goodyear's Patents, of Vulcanized Rubber Fabrics,
"ADAPTED TO MECHANICAL PURPOSES"
MACHINE BELTING, STEAM PACKING, HOSE, &c.
JOHN H. CHEEVER, Treasurer.
TERMS: CASH, or NOTE within 30 days, 6 Months from date, with exchange on New York.
24" Belts 1 ply each 2 ply
11" Belts 2in 2 Ply
1 " 3/2 2 Ply
25 Feet

In the year 1860, Mr. J. I. Case of Racine, Wisconsin, manufacturer of farm equipment, bought flat, narrow belting from New York Belting & Packing, as recorded by the above invoice.

Today, 92 years later, the company founded by Mr. Case, a nationally-known organization outstanding in its field, is still an enthusiastic user of NYB&P products.

Such long-continued association is not unique among NYB&P customers. It stems not only from the excellence of NYB&P products, but also from the fine service rendered by NYB&P Distributors. These key men are always ready in emergencies, always helpful with practical assistance and advice for any and all types of industrial operations.

NEW YORK BELTING & PACKING CO.

America's Oldest Manufacturer of Industrial Rubber Products

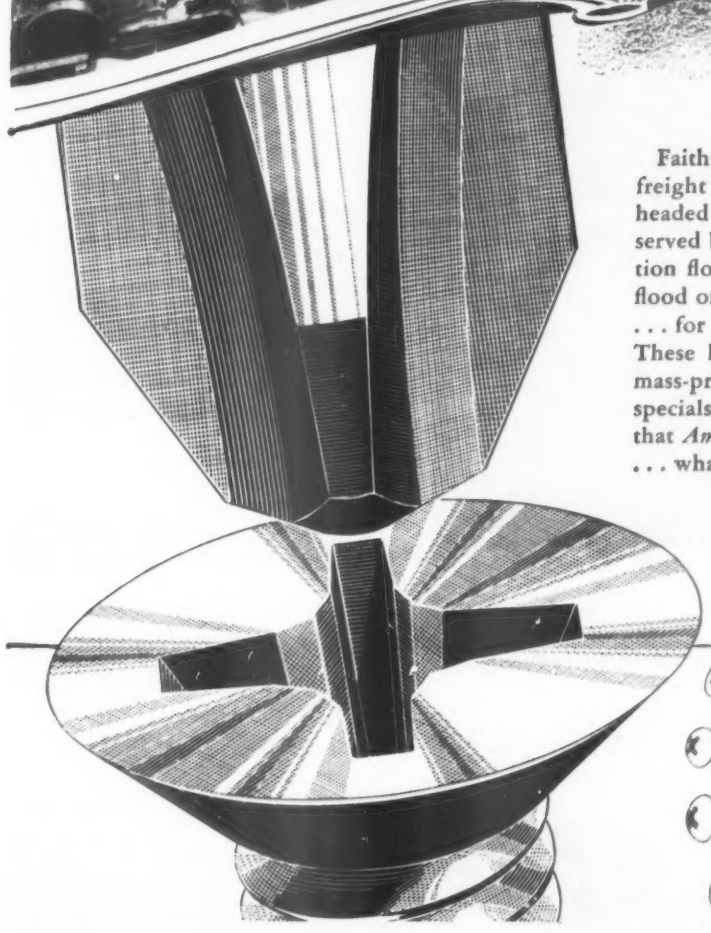
1 Market Street, Passaic, New Jersey

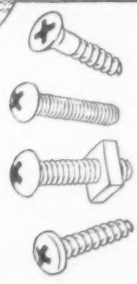
THE AMERICAN STORY

CHAPTER FIVE:

"The Faithful Freight Car"

Faithfully on schedule, every few days, a full freight car rolls out of the Willimantic plant . . . headed for just *one* of the scores of markets served by American. Here, on this 5-acre production floor, modern machines pour out a steady flood of fasteners . . . Phillips, slotted and special . . . for high-volume buyers in *all* industries. These high-speed facilities, plus experience in mass-producing threaded fasteners, standards or specials, are the reasons why you can bank on it that *American means Action* on every order. Now . . . what do *you* need, and how soon?





AMERICAN SCREW COMPANY

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Main Office & Plant
Willimantic, Conn.
Office & Plant, Norristown, Pa.
Office & Warehouse, Chicago, Ill.

Which of these PACKAGING IDEAS will save *your* time!

Vapor-from-Paper STOPS RUST

Saves greasing metal parts. Saves degreasing. It's Angier VPI® Wrap.

☐ *Check here for facts.*

New Machine Wraps Bumpers

Saves auto makers the job of hand wrapping. Does a better job —*faster.*

☐ *Check here for facts.*

Center-seam Sealing with Snake Tape

It's the FAST way to seal cartons, as the motion photo shows. And you get a *stronger* closure because Snake Tape is reinforced!

Center-seam sealing is accepted for parcel post, railway express, air express, and truck shipments; it also is accepted for carload and LCL rail shipments where rule 5, section 1 (c) of Uniform Classification applies.

☐ *Check here for FREE sample & facts.*

- *Reinforced*
- *Waterproofed*
- *Six widths*
- *Easily dispensed by "cut-off" type machines*

Our Industrial Papers Have Solved These Problems!

Can we help *you*?

☑ Check the ideas that interest *you* and send with letterhead to:
ANGIER CORPORATION
Framingham 1, Mass.

Angier

Since 1895 Manufacturers of Industrial Packaging Papers

Rafter-high storage of bulky boxed cereals at Kellogg Company, Battle Creek, Michigan.

TOWMOTORS IN ACTION IN U. S. INDUSTRY

Put 'em up...

Stop lacking storage capacity and overcrowding floor space . . . start stacking capacity-loads and cash in on otherwise wasted overhead space. Stacking is just one of countless handling jobs you can count on Towmotor to *keep on* doing better. "Man-Hour Thieves" tells the complete cost-cutting story. Write for your copy and name of your nearest Towmotor Representative. Towmotor Corporation, Div. 502, 1226 E. 152nd St., Cleveland 10, Ohio.

TOWMOTOR
THE ONE-MAN-GANG ®

FORK LIFT TRUCKS AND TRACTORS

Since 1919

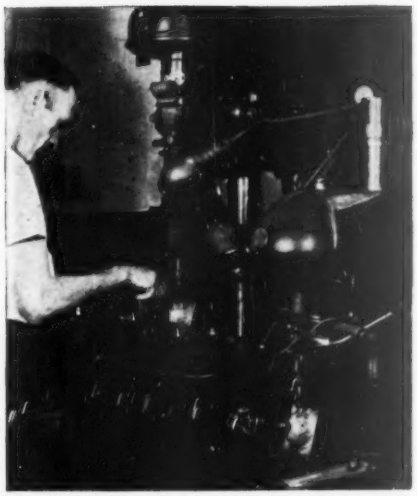
RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

DELTA MILWAUKEE

DELTA QUALITY MAKES THE DIFFERENCE

DELTA Means VERSATILITY–

In one line at the Astatic Corp., 18 Delta drill presses work interchangeably on such materials as steel, zinc, plastic thermo and bakelite, aluminum and brass. Overhead lines carry power and air and are set up so that additional machines may be moved in and out of the line as job conditions change.



DELTA Means MOBILITY–

Says Astatic: "An example of how we move our Delta tools to the job is the case of putting two 17 inch drill presses side by side so that a piece can be countersunk on one, tapped on the other by the same operator. In many cases we move Delta tools to the material instead of the material to the machine."

DELTA Means ACCURACY–

"With simple fixtures and Delta accuracy we make jobs practically fool-proof on machines which almost run themselves," reports the Astatic Corp. Astatic products for the communication industry are manufactured to high precision standards.

Down Go Costs

WHEN ASTATIC CORP. PUTS DELTA TOOLS ON JOB

These Production Ideas Will Work For You, Too.

Here's how the Astatic Corp., Conneaut, O., gets high production and high precision at low cost with a shop full of Delta tools—drill presses, grinders, bandsaws, table saws, jointers and belt sanders. This story of a manufacturer of microphones, radio, phonograph and television parts can apply equally well to your plant.

FLEXIBILITY — Because Delta tools are light and mobile, Astatic takes them to the material to be machined, cutting handling costs. They are moved in and out of the production line as jobs change, already set up to eliminate down time. As many as five different materials from steel to plastics are machined on the same Delta tools.

INTERCHANGEABILITY — By standardizing on Delta, Astatic uses the same jigs and fixtures on several machines without adjusters.

FEWER SET-UPS — By keeping machines set up for special jobs one operator can tend several machines and do sequence operations on a single part before laying it down. No waste motion. Because Delta tools are a low capital investment, they don't have to run constantly to pay out.

QUALITY — Most of the Delta tools at Astatic have been on the job six to nine years with only routine maintenance. The Astatic record proves that Delta gives you machine tool quality at a cost any production operation in your plant will justify.

Do you have an up-to-date catalog of Delta tools? Call your Delta dealer. He's listed under "Tools" in your Classified Phone Book. Or write direct to Delta Power Tool Division, Rockwell Manufacturing Company, 628B N. Lexington Avenue, Pittsburgh 8, Pa. Ask for Catalog AB52.

DELTA Means LOW COST—

Here's the Astatic story: "Because the cost of Delta tools is low, it is advantageous to maintain set-ups even if they are used only intermittently. Often an operator performs an operation on one machine, then turns to another for the second operation, saving the cost of repeated set-ups."

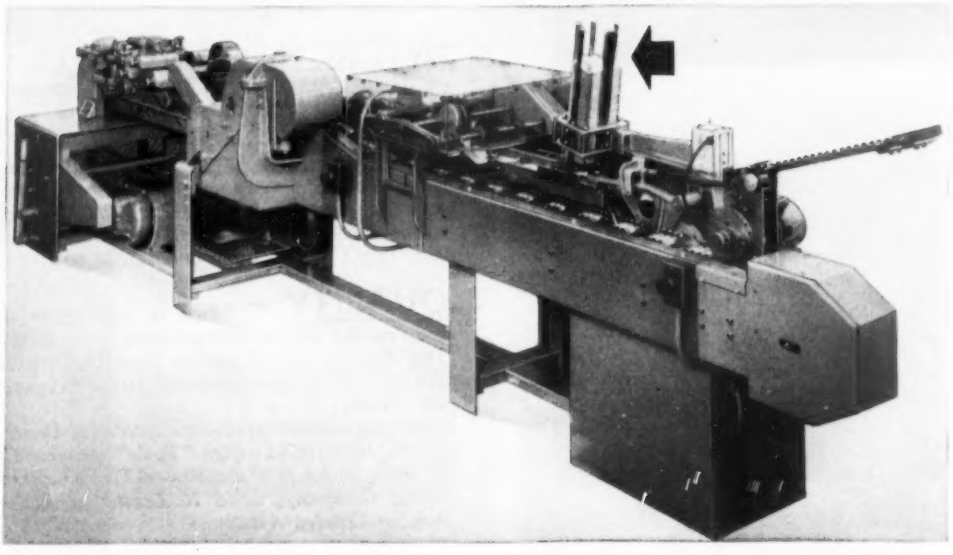
DELTA QUALITY POWER TOOLS

Another Product by **Rockwell**

Save by using available packaging machinery . . . . .

PACKAGE AS EFFICIENTLY AS YOU PRODUCE

Modern Standard-Knapp machines are packaging products ranging from cakes of soap to electric ranges. This is versatile equipment. It extends production line efficiencies to shipping platform. Reduces packaging costs in same proportion as modernized production methods reduce manufacturing costs.

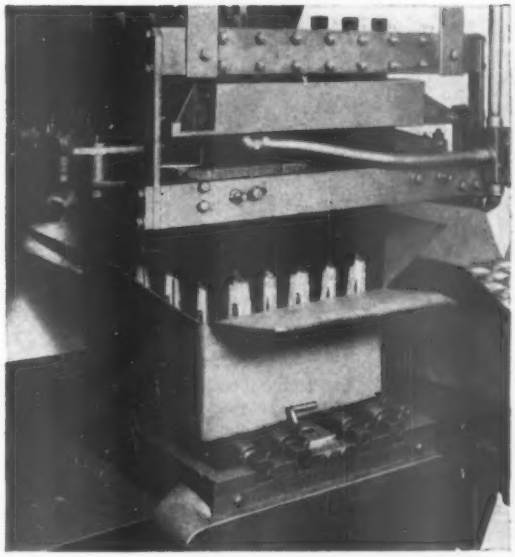


This Standard-Knapp machine automatically sets up cardboard carton, inserts rolls of film and then closes flaps of carton. Infeed chute at right accepts rolls of film, which are placed automatically three at a time in pockets. Arrow points to magazine holding flat cartons.

PRODUCT INTO CARTON AUTOMATICALLY

Reducing packaging costs for smaller products can start with automatic cartoning. The capabilities of this type equipment are demonstrated in the machine designed for packaging rolls of photographic film. The rolls of film are delivered to the infeed mechanism of the machine, which places them into pockets and then inserts them into individual cartons. The machine also sets up the carton, times its delivery to the insertion point, and then closes the flaps after the film is put in.

Bottle-filled cartons are smoothly packed into partitioned corrugated cases, which are automatically fed, loaded and discharged.

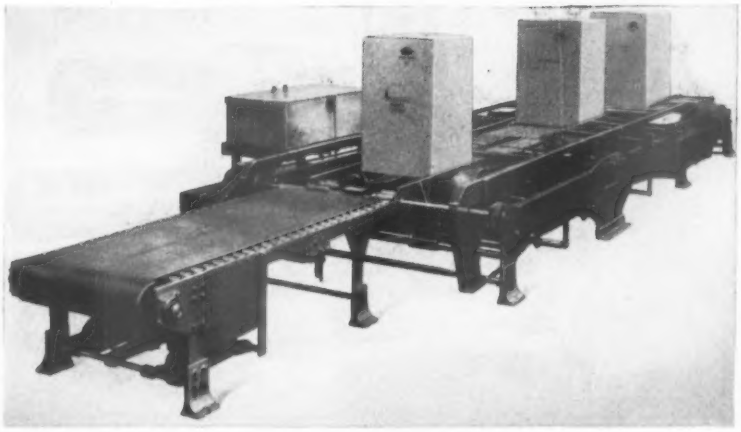


CARTON INTO SHIPPING CASE AUTOMATICALLY

Automatic handling can be started or continued on Standard-Knapp Packers. These machines accept bottle-filled cartons in a single file, arrange them into lanes, group them into the desired load pattern and then load them into partitioned corrugated shipping cases. Case feed can be automatic, or it can be accomplished manually.

This same basic type of machine will also automatically pack bottles, cans and jars into corrugated cases. Other packers by Standard-Knapp will mechanically load 5- and 10-lb. bags or packages into bales.

In this installation, corrugated cases with top flaps glued and sealed are placed over television sets on final assembly conveyor. Bottom flaps are then glued and sealed on automatic Standard-Knapp equipment, which is adjustable to varying case sizes.



SHIPPING CASE READIED FOR SHIPPING

Another point at which automatic operation can be started or continued is in the preparation of corrugated cases for shipment. The most economical method by far is direct application of glue to the case flaps, followed by secure sealing. No extra package fastening materials are required — the case is the complete package. Proof of the economy of this method — and its efficiency, too — is found in the use of Standard-Knapp Gluers and Sealers for such large items as television sets and electric ranges.

These units glue, fold and then seal the case flaps in a squared pattern until they are firmly and finally set. Code marking, printing or stamping of the cases can be simultaneous with the sealing operation.

Standard-Knapp also makes machines for gluing and sealing heavy paper bales.

BENEFITS

Standard-Knapp packaging machines are designed to:

- Assure *packaging rates* at increased speeds for present and future needs.
- Maintain *quality* of package in neatness, strength and protection of product.
- Provide *economies* in packaging operations in all items of cost, including materials, labor and maintenance.

HOW TO GET STARTED

Standard-Knapp packaging experts will be happy to study your requirements. They are as near as your telephone in the following cities:

Atlanta **Boston** **Chicago** **Cleveland** **Houston** **Los Angeles** **St. Louis** **New York City** **San Francisco** **Seattle**

FOR THE COMPLETE S-K STORY

write for catalogs describing machines for your industry to Dept. M. Standard-Knapp, Division of Emhart Mfg. Co., Portland, Conn.

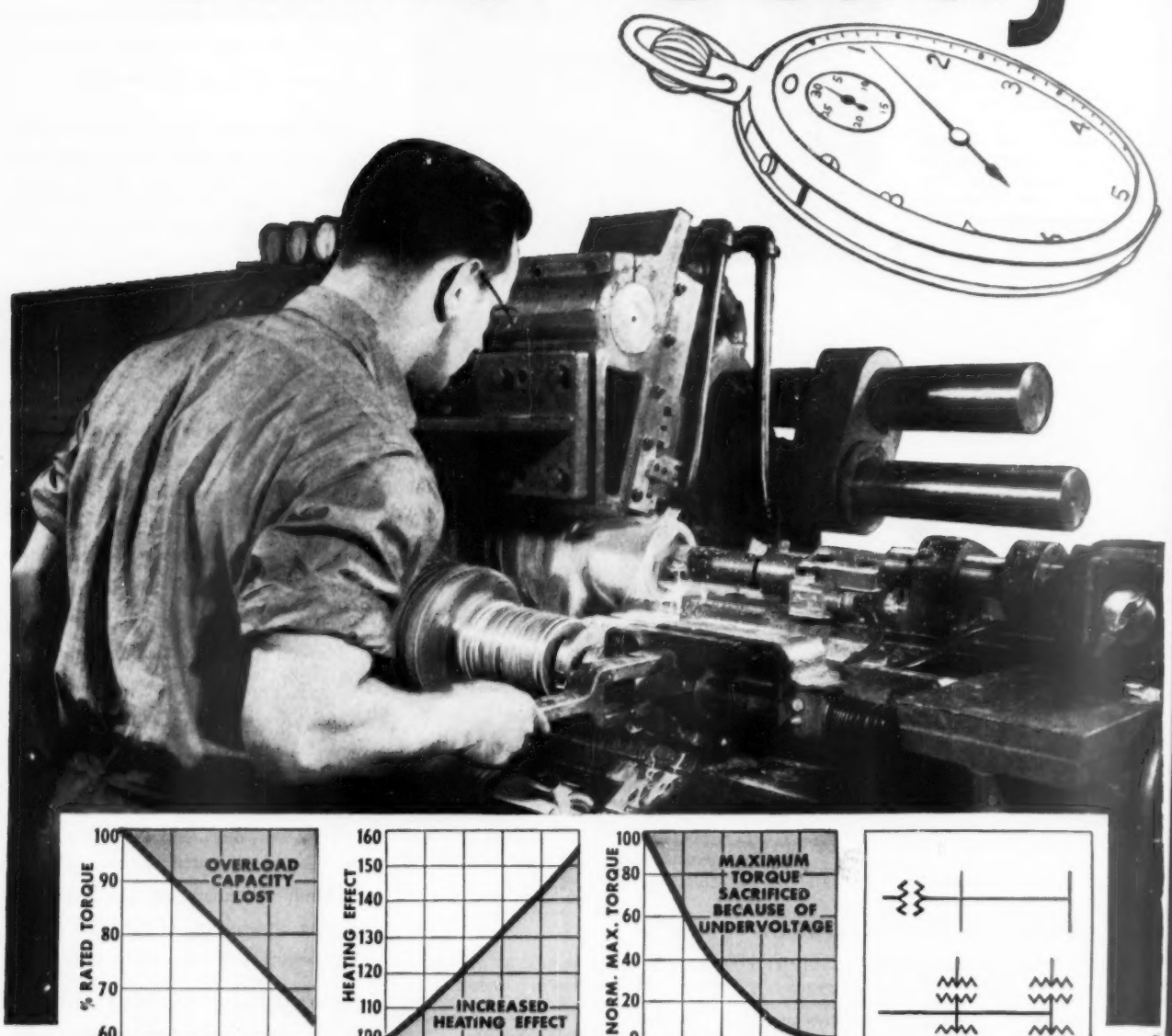
Only the best is good enough

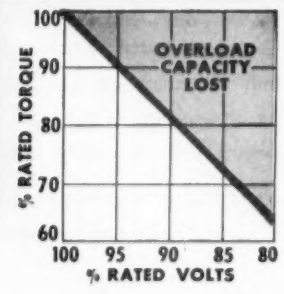
STANDARD-KNAPP

DIVISION OF EMHART MFG. CO.

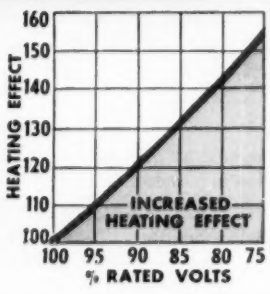
PORTLAND, CONNECTICUT

Time-Study

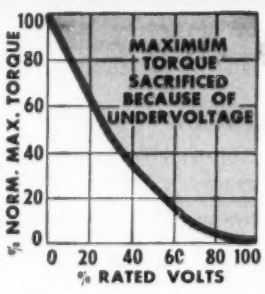




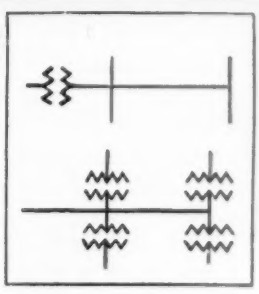
FULL PRODUCTION demands that rated voltage be maintained to all motors. Overload capacity, that extra push necessary for short intervals on many processes, falls off rapidly on undervoltage . . . falls approximately 10% for every 5% drop below rated voltage.



MOTORS BURN OUT quicker at undervoltage because of increased heating effect. Overload relays in the controls protecting your motors trip because of the extra current through them, open circuits to motors — cause machine down-time and production loss.



JOBS TAKE LONGER because torque and horsepower drop when voltage drops. Less torque means lighter cuts on lathes, shapers and other machine tools. More time must be spent to get the same job done. More overhead, more manhours must be figured into every job.



A MAJOR CAUSE of undervoltage is voltage drop in secondary feeders. Existing systems may not be adequate for new production schedules. Install A-C Substations at load centers to reduce line losses, cut feeder length, hold proper voltage, increase production.

Your Voltage

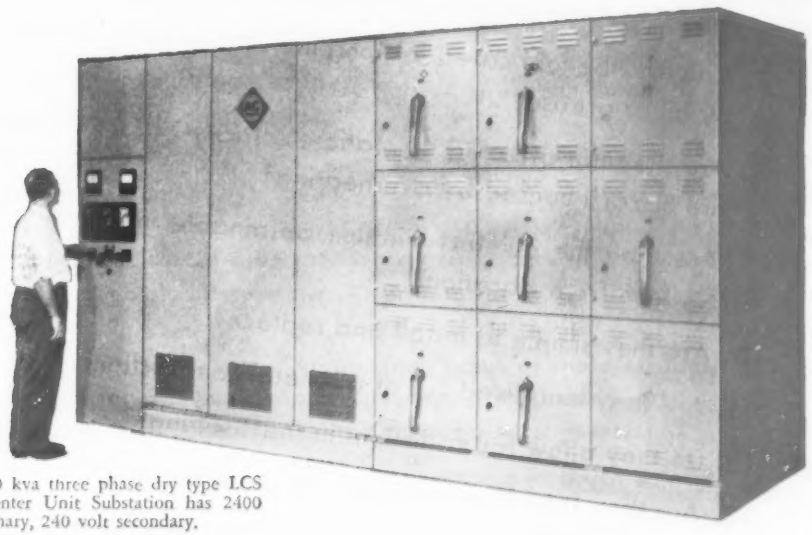
STOP WASTING MANHOURS on slow producing machines. Get the most from the production equipment in your plant by installing unit substations to correct undervoltage. No electrical equipment gives top performance *unless* it operates at rated voltage . . . and even well designed distribution systems may prove inadequate because of today's added loads and increased production schedules.

For example, if your squirrel-cage motors operate at 10% undervoltage, maximum torque available to start machinery is reduced 19% . . . heating effect within the motors is inceased 21% . . . overload capacity falls, efficiency drops.

Increase your output by eliminating production slow-downs resulting from overloaded motors . . . machine down-time due to tripped starters or circuit breakers. Install Allis-Chalmers LCS Unit Substations at load centers and eliminate excessive line drop by shortening low voltage cables. Allis-Chalmers LCS Load Center Unit Substations are neat, compact, easy to install, and provide protection to personnel.

You can count on the cooperation of experienced Allis-Chalmers substation engineers in working out your distribution system. Get in touch with your A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for bulletins 11B6285A, 11B6325B and 11B6895. A-3371

LCS
Unit Substation



This 750 kva three phase dry type LCS Load Center Unit Substation has 2400 volt primary, 240 volt secondary.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

How Do YOU Score on

How do the drives from the power source on the equipment in your plant score in this "driving" test?

	YES	NO
1. Do they transmit power positively and efficiently without costly slippage?	☐	☐
2. Do they assure positive, precise timing of machine operations . . . constant maintenance of speed ratios?	☐	☐
3. Do they have maximum shock absorbing ability?	☐	☐
4. Do they require only infrequent, low-cost, easy maintenance?	☐	☐
5. Are they compact . . . do they transmit large horsepower in limited space?	☐	☐
6. Are they sturdy and reliable . . . do not fail suddenly . . . will take abuse in emergencies?	☐	☐
7. Can they be lubricated for long life . . . are not affected by oil or grease?	☐	☐
8. Are they not affected by static electricity . . . free from fire hazard caused by overheating?	☐	☐
9. Are they the quietest medium obtainable in operation . . . free from vibration?	☐	☐
10. Are they simple to install and replace?	☐	☐
11. Are they long lived . . . of all-metal construction?	☐	☐
12. Do they allow for variations in shaft setting?	☐	☐
13. Are they free from pre-loads that shorten shaft bearing life?	☐	☐
14. Are they free from power loss, regardless of adjustment?	☐	☐

To find out how your drives rate, see opposite page.

This "Driving" Test?

Score seven points for every "Yes" answer. How did your drives make out? If you scored from 84 to 98 points, your drives are excellent, you're using the best drives for your equipment.

You're using chain drives.

If you scored from 64 to 83 points, your drives are probably in good shape, but you'd better check them over for possible improvements in chain application.

If you're using any other power transmission medium, you can't possibly score more than 63 points. Isn't that good evidence that your best bet for lower cost power transmission . . . greatest flexibility . . . greatest efficiency and dependability . . . *is chain.*

And, for the best in chain, choose from the complete Chain Belt Company line of Rex® and Baldwin-Rex® Chains. More than 2000 sizes and types offer you the greatest range of selection . . . permit you to pick the exact size and type that will best fit your requirements.

For lower cost . . . for greatest efficiency . . . for top quality . . . for best overall results from your equipment . . . specify *chain* . . . from the complete Chain Belt Company line.

For assistance in selection and application of chain for your drives and conveyors, for best overall results, call your Chain Belt Field Sales Engineer. He's ready, willing and able to help you.

In addition, a large list of helpful literature is available for the asking. Here is a partial list of titles which may be of interest to you:

Care and Maintenance of Chains—Rex Lumber Mill Chains—Rex TableTop Chains—Rex Chains for Cement and Rock Products Industries—Rex and Baldwin-Rex Conveyor Chains and Attachments—Baldwin-Rex "BA" Riveted Roller Chain—Baldwin-Rex Stock Roller Chains—Baldwin-Rex Flexible Couplings—Baldwin-Rex Tension Linkages—Baldwin-Rex Double-Pitch Roller Chains—Unusual Applications of Roller Chain. *Send for any or all of these booklets today.* Chain Belt Company, 4667 West Greenfield Ave., Milwaukee 4, Wis.

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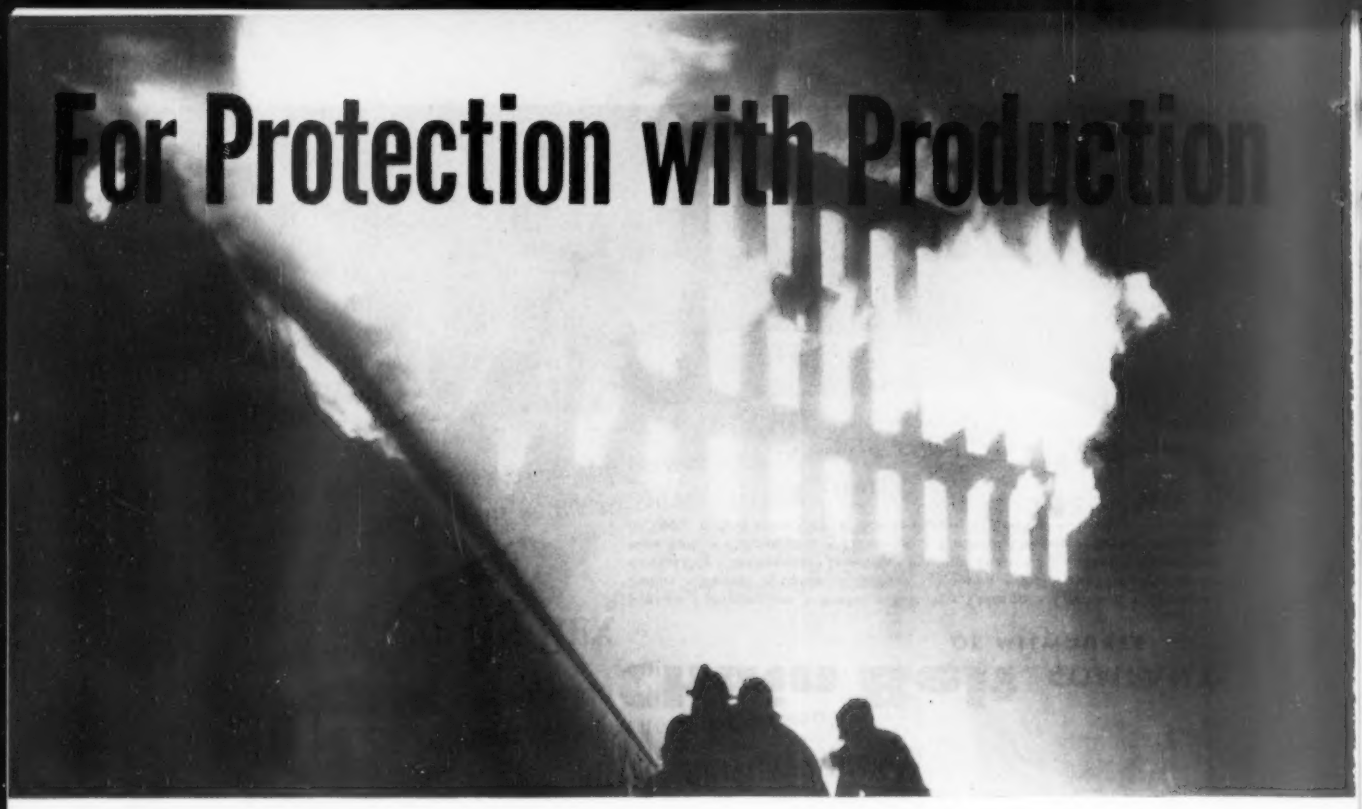


Store with safety with PROTECTOSEAL

APPROVED

VENTS AND FITTINGS

1 **NEW SELF-POSITIONING SELF-CLOSING AUTOMATIC FAUCET** with Flame Arrester, the perfected result of years of experiment, testing and design. Perforated brass flame arrester is placed within the body at the outlet where it provides best protection and is easily removed for cleaning and inspection without disconnecting Valve is outside of body where valve seat is not distorted by excessive pressure Furnished standard with Buna N, Neoprene or Thiokol gaskets; other materials available upon request.

2 **DRUM BUNG FITTING,** a combination fill and vent inserted into the bung opening of the drum which provides vacuum and automatic pressure relief to guard against explosion of drum under fire conditions. Double perforated metal fire baffle extends into drum to permit re-filling without danger of interior fire. A safety protection in the storage of flammables in sealed drums, especially when located in plant store rooms.

3 **FILL AND VENT FITTING,** a combination fitting which permits rodding and sampling of either underground or above ground storage tanks. Double concentric cylinders extending from top of fill pipe to the bottom of tank help guard against fire and explosion when filling and rodding. Pressure relief valve in top closes by gravity and rises to full height under extreme conditions. Vacuum relief valve rises to admit air as tank contents are pumped out or to compensate for cooling. Weather cap provides full protection to valves. Cover may be padlocked.

Other Protectoseal Safety Storage Products include Conservation Vents and Flame Arresters, Plate Type Non-Condensing Vents, Storage Tank Seals and Tank Car Fittings. Request special Vent and Fitting Catalog.

APPROVED *by Underwriter's Laboratories*

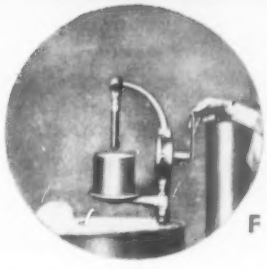
in the Use of Flammable Liquids

PROTECTOSEAL

APPROVED SAFETY PRODUCTS

Protect against fire and explosion **Seal** against loss by evaporation

Prevent waste in handling **Speed** production



A SAFETY CANS—Double concentric fire baffle located inside base of spout. Spring loaded cap is mounted on ball and socket joint and automatically makes tight, even closure upon release. Seam welded container is air pressure tested. Squeeze grip handle for controlled pouring.

B SUPPLY CANS—Double perforated-metal fire baffles at filling closure and base of flexible pouring spout. Valve also at base of flexible spout is conveniently operated by carrying handle to give positive control when pouring. Sturdy seam welded container factory tested before shipment.

C BENCH CANS—Spring mounted perforated dasher is a fire baffle. If ignited, liquid on dasher burns out but liquid in can is safe from ignition. Occupies small space; ideal for cleaning small parts.

D PLUNGER CANS—Slight pressure depresses dasher and liquid is drawn momentarily into dasher cup for transfer to swab or sponge. Excess liquid automatically drains back into can. Fire baffle in dasher prevents ignition of contents. Operates with one hand and is ideal for cleaning parts on production line.

E OILY WASTE CANS—Tight, seam welded body with snug fitting cover which closes automatically to smother fire. Cover opens wide with slight foot pressure on full-width treadle and provides large opening for placing or removing rags. Ventilated bottom; smooth sides inside and out; balanced base guards against accidental tipping.

F TRANSFER PUMP—Provides complete protection against explosion and fire hazards in transfer of hazardous liquids. Three flame arresters are built into pump at spout, above bung adaptor and at strainer inlet within drum. Protected openings provide for vent and pressure relief. Pump requires no priming, is light in weight and made of special aluminum alloy to resist corrosion.

Whatever your requirements may be in the safe handling of flammable liquids in storage and in use, Protectoseal has a specialized approved product which guards against fire and explosion, and protects life and property. Secure complete information on this extensive line of safety products today. Fill in coupon or attach to company letterhead.

THE PROTECTOSEAL COMPANY

1920 South Western Avenue, Chicago 8 • *In Canada:* Safety Supply Co., Toronto

The Protectoseal Company
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Send catalogs giving complete description, specifications or sizes and prices on your complete line of Safety Equipment for all phases of storing, handling, dispensing and using flammable liquids.

Name_____

Title_____

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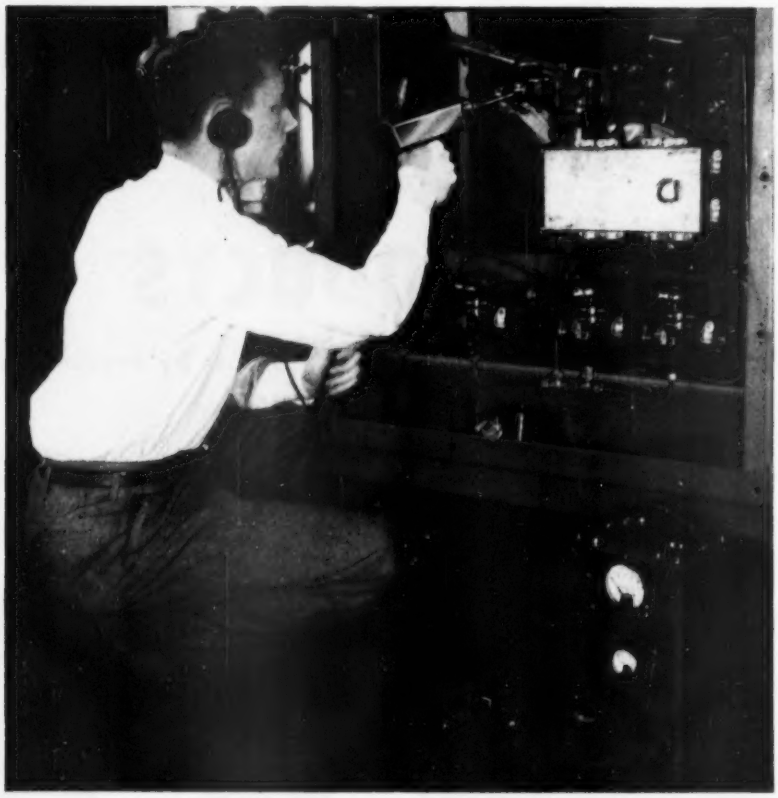
PRODUCTION INSTRUMENTS



OPERATOR USING DETECTOR MAKES INSPECTION OF COMPRESSOR FOR LEAKS

Worthington Corp. Cuts Inspection Time on Compressors With G-E Leak Detector

Worthington Corporation, Holyoke, Mass., now finds small leaks quickly with a G-E Type H leak detector. This portable detector saves time in the inspection of completed compressors and refrigeration equipment. Leaks are located in minutes where formerly days were required.

Freon 12 is introduced as a tracer into the closed systems to be checked. The probe of the detector is passed along welded seams, pipe taps, and tube ends locate small leaks. At maximum sensitivity, the Type H will detect a leak so small that in one year only 1/100 oz. of Freon will pass through the opening.

Mr. William Schmalfuss, chief inspector, reports, "Use of the detector assures us that our customers receive a product that has been thoroughly inspected and is free of leaks. Now we can find leaks in a matter of minutes that used to take us days."

Price of complete unit is $605.00.* For more information on the G-E Type H leak detector, check the coupon on the next page for bulletin GEA-5610.

No Cages or Tape Needed With G-E High-Pot Tester

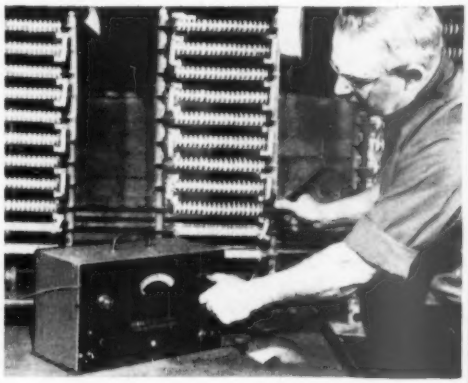
By limiting the output current to a maximum of 5 milliamperes, the new General Electric current-limited high-potential tester effectively minimizes most of the hazards encountered with most high-potential testing equipment. No barriers, cages, or white tape are needed since the current is below the "let-go" value. A retractable prod is provided to prevent the operator from coming in contact with the high-voltage circuit.

NON-DESTRUCTIVE TESTING

The tester's current-limited feature prevents flashovers from burning insulation or damaging equipment. A neon lamp on the panel gives warning before the insulation breaks down. Faults are indicated by a drop in voltage on the meter.

LIGHTWEIGHT AND PORTABLE

The G-E high-potential tester can be easily carried to new locations to test equipment and plugged into any 115-volt,



a-c outlet. It is ideal for manufacturers of such electrical equipment as coils, relays, motors, and appliances.

A wide range is available, from 0 to 3500 volts. Price is $226.20.* For more information, check coupon for GEC-700.

GENERAL ELECTRIC

FOR TESTING AND INSPECTION

U.S. Stamping Co. Standardizes Coatings And Cuts Costs with G-E Thickness Gage

The U.S. Stamping Company, Moundsville, W. Va., manufacturing over 1200 different enamel-ware products, reports that the G-E Type B Thickness Gage enables them to lower their manufacturing costs considerably through quality control. A company representative said, "This is possible because an excessive amount of enamel on a product causes flaking and chipping during the heating process, while if the enamel is too thin, it will burn. By using the thickness gage, it is a simple matter to maintain the correct enamel coating at all times. This greatly reduces defects and enables us to standardize on coatings."

USED ON PRODUCTION LINE

Because the gage is portable and operates on any 110-volt circuit, the U.S. Stamping Company is able to use it right on the production lines. The operator merely holds the gage head against the coating being measured and reads the thickness directly on the dial of the instrument.

WIDE MEASURING RANGE

The gage will measure the thickness of any non-magnetic material on a magnetic base. It is available in ranges from 0.0002 to 0.10 inches. Prices start at $166.92.* Check coupon below for bulletin GEC-319.

Portable Double Bridge Aids Acceptance Test

Materials acceptance tests of Manganin wire, which is used for instrument shunts, are currently being aided by the General Electric portable double bridge.

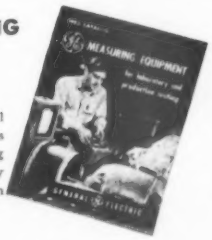
Specifications for this wire list maximum acceptable specific resistance. This requirement is quickly checked for each length of wire by first measuring its dimensions and then using the double bridge to measure its resistance.

EASY TO USE

Designed for easy operation, the G-E portable double bridge has only one dial to adjust while making measurements. It contains its own d-c source and needs only one operator who can use the bridge at the location of the apparatus containing an unknown resistance. For maximum utility, it has eight ranges, measuring resistance values from 0.0001 to 22 ohms. Price $304.20.* Bulletin GEC-251.

G-E MEASURING EQUIPMENT CATALOG

80 pages describing all of General Electric's testing and measuring devices. For free copy check GEC-1016 in coupon at right.



G-E Insulation-resistance Meter Cuts Insulation-Failure Rejects

Reduction of rejects due to insulation failure is easily accomplished with a General Electric insulation-resistance meter.

SAFE TO OPERATE

Since the maximum output current is limited to two milliamperes, the meter can be operated safely. It can be used wherever 115-volt, 50- or 60-cycle power is available. Insulating resistance can be measured over a range of 0–20,000 megohms.

COMPACT—PORTABLE

The G-E insulation-resistance meter is small, compact, and portable—convenient for production and service testing. It is extremely valuable in detecting faults during the manufacture of electrical equipment. Only one operator is required. Price $304.20*. Check the coupon for GEC-753.

** Manufacturer's suggested retail price.*

SECTION A605-31, GENERAL ELECTRIC CO.
SCHENECTADY 5, N. Y.

Please send me the following bulletins:

Indicate:
√ for reference only
× for planning an immediate project

- ☐ Type H Leak Detector (GEA-5610)
- ☐ High-potential Tester (GEC-700)
- ☐ Type B Thickness Gage (GEC-319)
- ☐ Portable Double Bridge (GEC-251)
- ☐ Insulation-resistance Meter (GEC-753)
- ☐ Measuring Equipment Cat. (GEC-1016)

NAME .....
COMPANY .....
STREET .....
CITY ..... ZONE ..... STATE .....

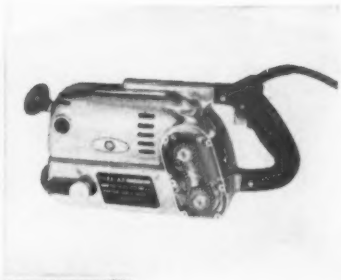
Is there ONE chain your drive or

YES! And you'll find the answer in LINK-BELT's complete chain line — a size and type for your specific job

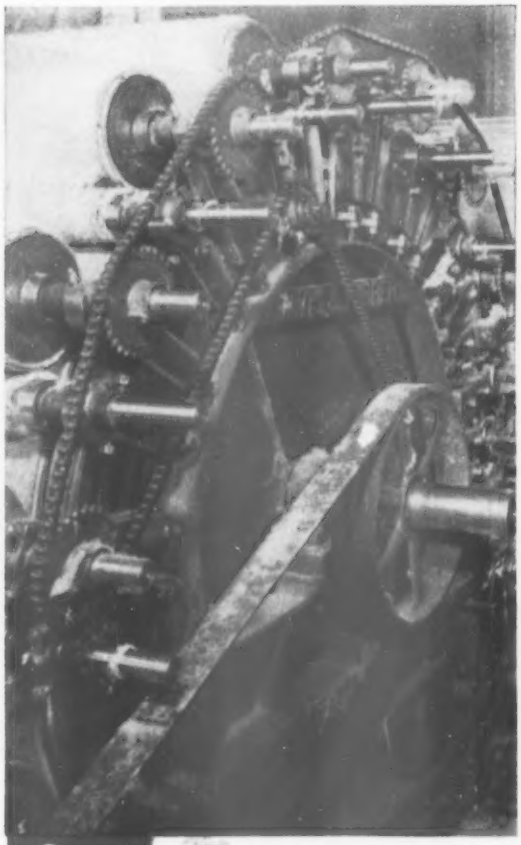
BABY CREAM JARS are capped and inspected as they ride on individual carrier plates of Link-Belt Universal Crescent flat-top chain conveyor. Vertical curves as well as sharp horizontal bends are easily traversed. Link-Belt makes six different types of flat-top chain, each engineered for a specific service.

that best meets conveyor problem?

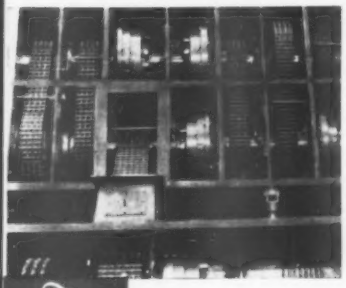
PULPWOOD LOGS are discharged from drum barkers onto a 12-strand Link-Belt sorting table. This Class C Promal chain resists both abrasion and corrosion, provides long life under tough conditions.



PORTABLE BELT SANDER employs high speed, compact, efficient Link-Belt 3/16-in. pitch Silverstreak Silent Chain. Designers throughout industry rely on this drive for pinion speeds up to 9000 rpm.



WOOL CARDING MACHINE ROLLS are driven by Link-Belt Precision Steel Roller Chain and Sprockets to insure positive, uniform transmission of power independent of temperature variations.



OIL FIELD DRILLING RIG utilizes multiple-width Link-Belt Roller Chains with their E-Z Assembly feature. Even under the most rugged service conditions, these dependable chains provide long life.

COAL is handled by Link-Belt rivetless-chain flight conveyor that includes Flint-Rim Sprockets. Link-Belt makes all sizes and types of cut and cast tooth sprockets for every drive and conveyor service.

Follow the lead of all industry — for your complete drive and conveying chain needs rely on . . .

LINK-BELT

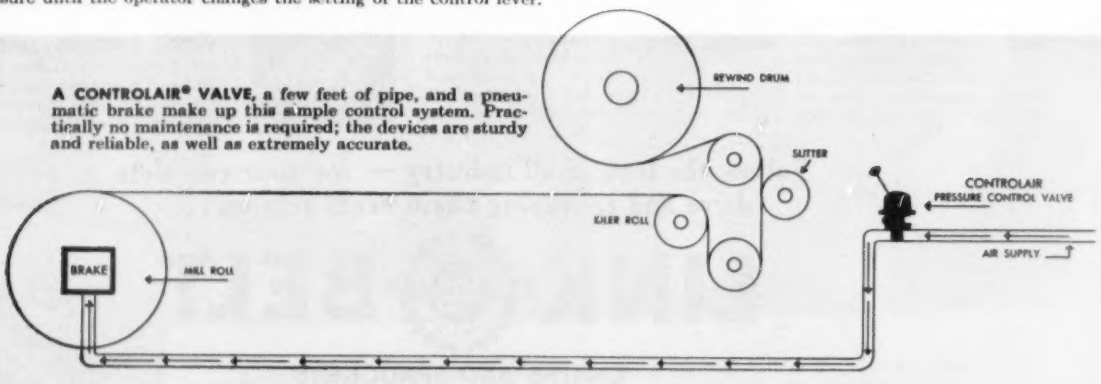
CHAINS AND SPROCKETS

LINK-BELT COMPANY Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities. 13.097

Let AIR do the work

COMPRESSED AIR is used to control paper tension in this Camachine paper slitter installed at Miro Container Co., Inc. A Westinghouse Controlair® pneumatic valve regulates the air pressure. Once set, this valve automatically maintains the desired air pressure until the operator changes the setting of the control lever.

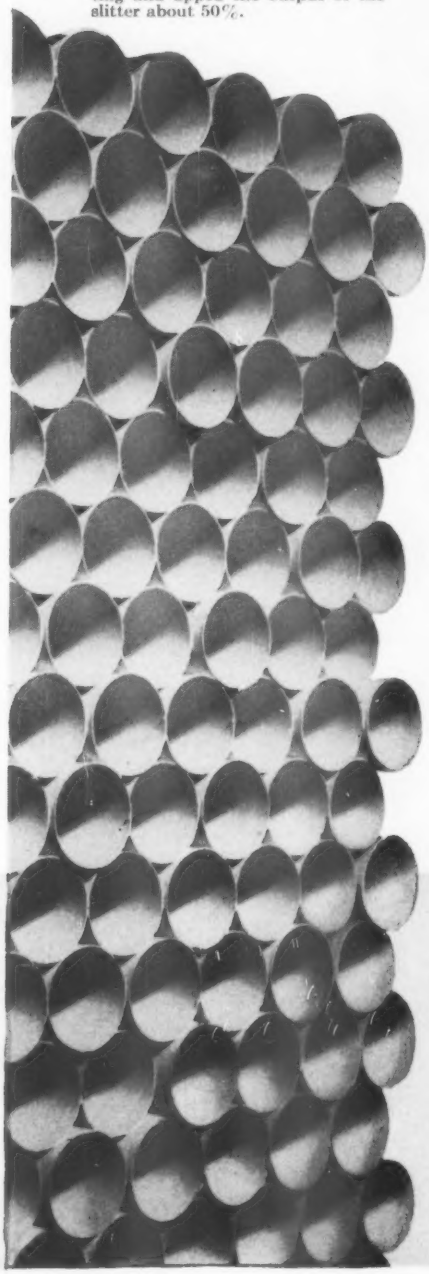
A CONTROLAIR® VALVE, a few feet of pipe, and a pneumatic brake make up this simple control system. Practically no maintenance is required; the devices are sturdy and reliable, as well as extremely accurate.



Westinghouse pneumatic control

boosts output of paper slitter 50%!

HERE'S THE PRODUCT—paper food containers that are wound from paper that is slit on the Camachine. Precise penumatic control materially reduced torn paper during slitting and upped the output of the slitter about 50%.



"*Don't take it away!* This Controlair® valve really works smooth!" That's what the man said who runs the Camachine paper slitter at the Brooklyn plant of Miro Container Co., Inc. The new Westinghouse air-pressure control valve was paying off — in more production, lower costs, and smoother operation.

Cameron Machine Co. of Brooklyn, N. Y., makes the Camachine. They control paper tension by regulating the speed of the input paper roll with a pneumatic braking system. The air pressure supplied to the brake diaphragm must be controlled precisely to prevent backlash and interleaving of the paper; but the valve they had been using was inaccurate. Paper was tearing and interleaving, wasting paper and delaying production.

The Westinghouse Controlair® valve has everything Cameron engineers had been looking for. It's rugged and simple. It operates easily. And it's *accurate* . . . automatically maintains a selected air pressure against line leakage.

Since this valve was installed at Miro Container Co., paper loss has dropped about 10%. With fewer production delays, about 50% more paper can be slit per day.

PUT AIR TO WORK ON *YOUR* EQUIPMENT

We can give you expert advice on the most profitable way to use air. And we can offer you a complete line of proven pneumatic devices—everything from air compressors to valves and actuators and including a complete *new* line of cushioned pneumatic cylinders, all made by Westinghouse Air Brake Co. Write for information.

Westinghouse Air Brake
COMPANY

INDUSTRIAL PRODUCTS DIVISION WILMERDING, PENNA.

Factory Branch: Emeryville, Calif.
In Canada: Canadian Westinghouse Co. Ltd., Hamilton, Ontario

Here's what you can do with the CONTROLAIR® pneumatic valve

Use this Westinghouse Controlair® valve wherever you want a variable, controlled air pressure below 100 psi. It has been used to operate pneumatic clutches, brakes, cylinders, and actuators on diesel engines, hoists, wire-drawing rolls, chemical flow valves, clamping devices, and other equipment. You can operate this valve by hand, foot, or cam.

Other pneumatic devices made by Westinghouse Air Brake Co. include: flow, relay, and check valves, chokes, cocks, single- and double-acting cylinders, actuators, line filters, and air compressors. You can get a complete pneumatic system from Westinghouse Air Brake Co.

RED HOT STEEL AND

RUSHING WATER DON'T AFFECT UNOBA GREASE

This large steel mill puts multi-purpose UNOBA grease to the most *severe* tests possible. UNOBA lubricates the giant rollers on this rugged 32-inch blooming mill as it pounds white-hot steel ingots into 4" x 4" rods. UNOBA grease must withstand the constant rush of cold water used to control the extreme temperatures the rollers absorb from the glowing steel. And UNOBA adheres to these roller bearings despite the severe shocks they take as the steel is pounded into shape.

UNOBA is able to resist *both* heat and water because it is a *barium* base grease. UNOBA sticks to metal surfaces with a tenacity that even boiling water can't break. And multi-purpose UNOBA gives protection at temperatures from below freezing to over 300 degrees F., *regardless of moisture!*

Because of its versatility, UNOBA can be used in practically *all* your grease-cup and gun fittings. In some factories, this one grease has replaced as many as seven specialized lubricants. UNOBA will protect against internal rust, prevent excessive wear and prolong the life of machinery parts.

Developed by the makers of T5X—the amazing purple heavy-duty motor oil.

Contact your nearest distributor of UNOBA grease

Learn the money-saving story of multi-purpose UNOBA grease and arrange for delivery of a trial supply. Write or phone your nearest Union Oil Company office or UNOBA distributor.

DISTRIBUTORS

ALABAMA
- Graham Oil Company, Atmore
- Royal Oil Co., Birmingham

ARKANSAS
- Henley Oil Co., Fort Smith

COLORADO
- Pyramid Petroleum Co., Denver

CONNECTICUT
- Royal Distributors, Inc., Hartford

DELAWARE
- Sterling Auto Parts, Inc., Wilmington

FLORIDA
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- Prior Tire Co., Atlanta
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ILLINOIS
- Haines Oil Co., Towanda
- Lake Shore Oil Co., Chicago
- Lohse Automotive Service, Rock Island

ILLINOIS (continued)
- Automotive Wholesale Co., Macomb

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- J & D Distributing Co., Indianapolis

IOWA
- Inter-State Oil Co., Des Moines

KANSAS
- Inter-State Oil Co., Wichita

KENTUCKY
- EFoil Distributors, Louisville

LOUISIANA
- Petroleum Distributing Co., Houma
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- Darling's Inc., Bangor
- American Gear Co., Portland

MARYLAND
- Cord Equipment Co., Baltimore

MASSACHUSETTS
- Holyoke Auto Parts & Equipment, Inc., Holyoke
- Christie & Thompson, Inc., Worcester
- Detroit Supply Co., Inc., Pittsfield

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- Mich-I-Penn Oil & Grease Co., Detroit

MINNESOTA
- Bulk Oil Co., Minneapolis

MISSOURI
- Inter-State Oil Co., North Kansas City
- Jenkin-Guerin, Inc., St. Louis

NEBRASKA
- Inter-State Oil Co., Omaha

NEW HAMPSHIRE
- Sanel Auto Parts, Inc., Concord

NEW JERSEY
- Cook & McGraw, Hackensack
- Hellmund Oil Co., Hillside

NEW YORK
- D & M Motive Parts Co., Staten Island
- Davis Howland Oil Corp., Rochester
- Detroit Supply Co., Inc., Albany
- Martin S. Golden, Inc., White Plains
- King & Falk, Inc., Pearl River
- Para Marine Distributors, Inc., Oyster Bay, L.I.
- Regal Oil Co., Ridgewood

NORTH CAROLINA
- Hickory Auto Parts, Inc., Hickory

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- Mann's Automotive Supply, Inc., Dickinson
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OHIO
- Harrison Tire & Rubber Co., Cincinnati
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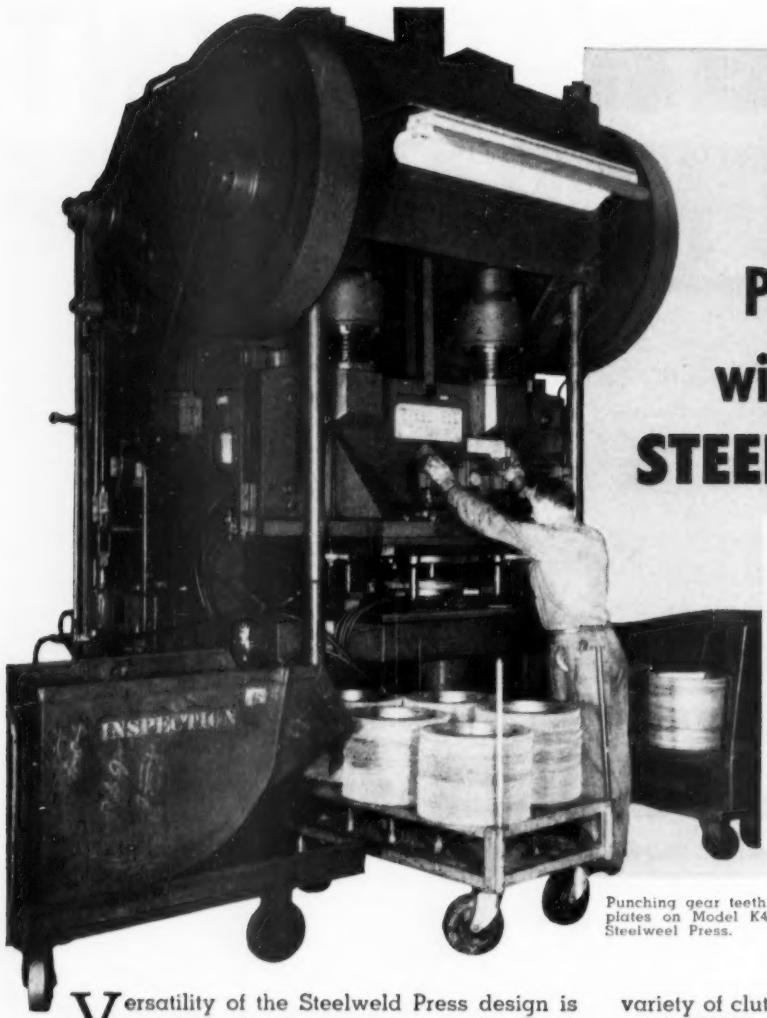
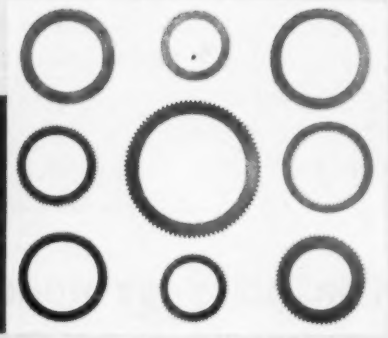
CINCINNATI: 2111 Carew Tower Building • NEW ORLEANS: 917 National Bank of Commerce Building

UNION OIL 76 COMPANY OF CALIFORNIA



Punching gear teeth in clutch plates on Model K4-4 300-ton Steelweel Press.

2,000 Clutch Plates Punched Per Shift with SPECIAL STEELWELD PRESS



Some of the many plates punched on the Steelweld Press, ranging from 11¾" to 22¾" diameter, all of .089 steel.

Versatility of the Steelweld Press design is convincingly demonstrated at the S. K. Wellman Co., Cleveland, where a machine, adapted for punching purposes, turns out 2,000 clutch gear rings per eight hour shift. Equipped with a specially wide bed and ram for accommodating the dies, and vertical tie rods at front for securing necessary rigidity, the design provides an economical press with stamina required for heavy-duty service.

Installed late in 1949, the machine has been in nearly continuous operation ever since, working 24 hours a day, six days a week. A large variety of clutch plates are punched. The largest is 22¾" O.D. of 13-gauge steel, with all teeth on the outside being punched at one stroke. The heaviest clutch plates punched are of 11-gauge steel. Multiple punching and notching are also done. The gear ring discs and washers are usually run through in lots of 4,000 to 25,000 at a time.

Because of satisfaction with this press, Wellman has purchased another larger Steelweld Press to help satisfy the growing demand for "Velvetouch" clutches, plates, facings and brake linings, used widely on tractors, trucks and heavy industrial equipment.

GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

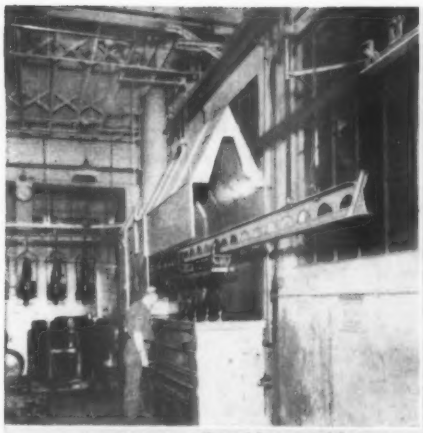
THE CLEVELAND CRANE & ENGINEERING CO.

3235 EAST 281st STREET, WICKLIFFE, OHIO

STEELWELD

BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING



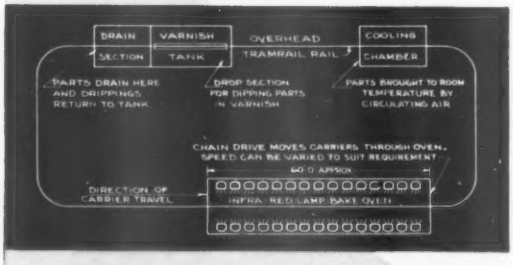
Armatures are dipped into varnish by use of a tramrail drop section which later is raised permitting carrier to travel forward.

After draining, armatures are advanced to oven. Carriers are traveled slowly through oven by motor-driven chain drive.

DIP-BAKE-DRY

It's FAST, CLEAN and EASY with this Simple Overhead System

In cooling chamber armatures are cooled to room temperature.


DRAIN SECTION
VARNISH TANK
OVERHEAD TRAMRAIL RAIL
COOLING CHAMBER
PARTS DRAIN HERE AND DRIPPINGS RETURN TO TANK
DROP SECTION FOR DIPPING PARTS IN VARNISH
PARTS BROUGHT TO ROOM TEMPERATURE BY CIRCULATING AIR
CHAIN DRIVE MOVES CARRIERS THROUGH OVEN. SPEED CAN BE VARIED TO SUIT REQUIREMENT
60'-0 APPROX.
DIRECTION OF CARRIER TRAVEL
INFRA-RED LAMP BAKE OVEN

Many man-hours are saved by a simple, efficient and inexpensive overhead loop Cleveland Tramrail system in the Varnish Insulation Department of the Arrowhead Plant of D. W. Onan & Sons, Minneapolis, large manufacturer of electrical generating plants.

Armature and other parts are dipped in varnish, drained, baked and air cooled without manual handling. Only when they are hung onto or taken off the tramrail carriers need they be handled. Every trip around the loop completes a varnish application.

The system makes the work fast and easy. More parts are treated at lower unit cost. Both workers and room are kept clean and free of sticky varnish.

GET THIS BOOK!

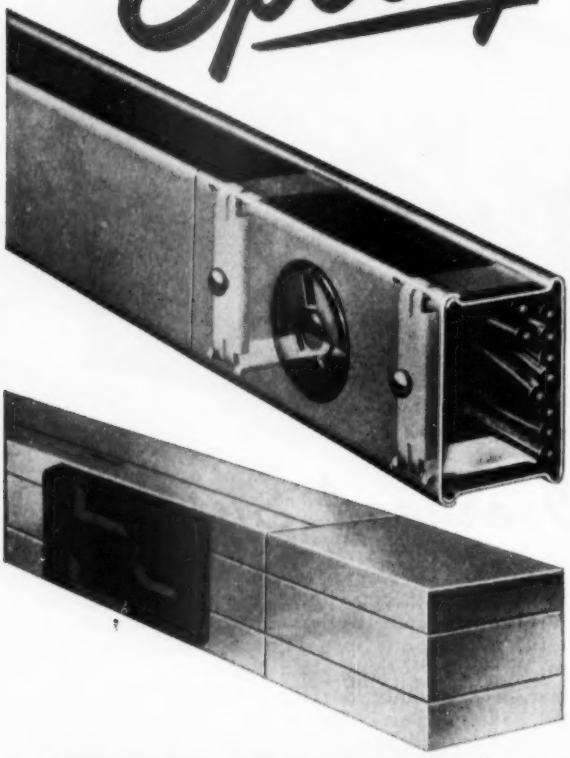
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3213 East 284th St. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

National Electric

Surface Raceways for *Speedy* INDUSTRIAL WIRING,



Use SURFACEDUCT for—

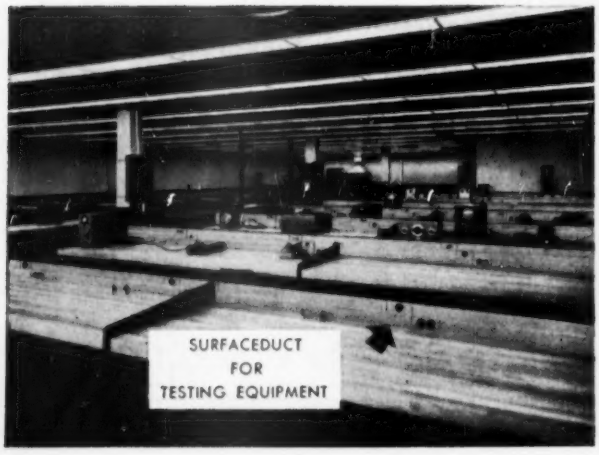
- **Feeder and distribution systems**
- **Lighting installations**
- **Assembly lines, laboratories, work benches**
- **Rewiring existing plants**

Accommodates over 300 manufacturers' devices—22 simple fittings for all job requirements.

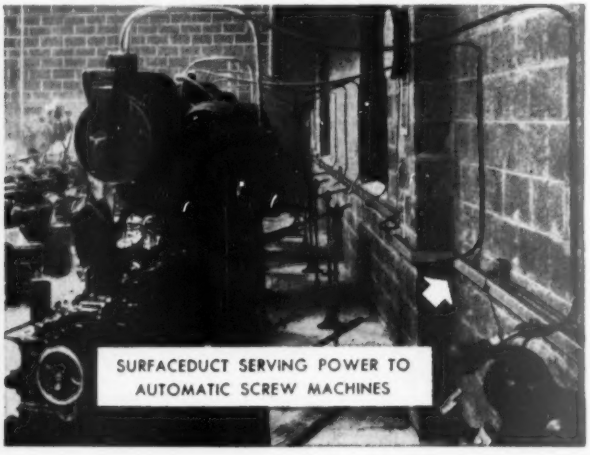
Use "PLUG-IN" STRIP (Type CF2-G with Grounding Facility) for—

- **Portable equipment**
- **Hand tools**
- **Assembly benches, electrical testing departments, etc.**
- **General office equipment**

A s-p-r-e-a-d of outlets every 6″ or 18″ for convenience *plus* safe grounding built-in. Permits use of either grounded or ungrounded devices from same outlet.



SURFACEDUCT FOR TESTING EQUIPMENT



SURFACEDUCT SERVING POWER TO AUTOMATIC SCREW MACHINES

EXTENSIONS and RELOCATIONS

National Electric raceways *go up fast*—just the thing for quick, easy industrial rewiring jobs, electrical additions and relocations.

All NE Surface Raceways are two-piece base and capping with the famous "Lay-in" principle designed to save time—*and money.* No fishing required. Attach the base, lay-in the wires, snap on the capping and the job is done! ("Plug-In" Strip comes pre-wired from the factory, ready to use.)

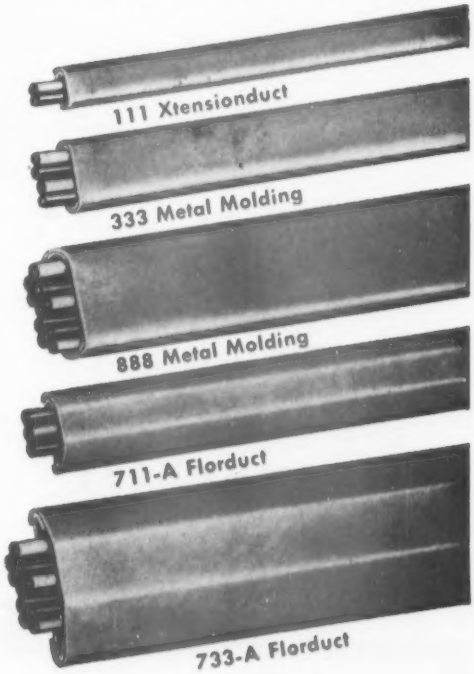
There's an NE Surface Raceway for every type and size of electrical distribution up to 60 amperes. A minimum of fittings, yet meets requirements for all types of installations.

WRITE for our catalogs on "Surface Raceways" and "Plug-In Strip" for complete details.

NATIONAL ELECTRIC PRODUCTS CORPORATION
1347 Chamber of Commerce Building
Pittsburgh 19, Pennsylvania

LISTED BY UNDERWRITERS' LABORATORIES, INC.
SOLD THROUGH LEADING ELECTRICAL WHOLESALERS

OTHER NE SURFACE RACEWAYS



EVERYTHING IN WIRING POINTS TO

National Electric Products

PLANTS IN AMBRIDGE, PA. • TORRANCE, CALIF.
ELIZABETH, N. J.

1878

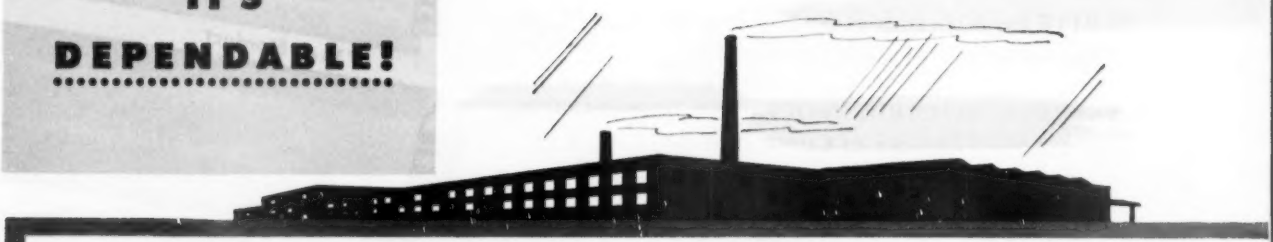
DODGE

1953

75 YEARS

75th ANNIVERSARY

IF IT'S DODGE
IT'S
DEPENDABLE!



TAPER-LOCK SHEAVES
476 stock sizes in A, B, C and D grooves. There is only one TAPER-LOCK—the world's simplest, surest mechanism for mounting wheels on shafts.

TAPER-LOCK FLEXIBLE COUPLINGS
Simple, effective design. Same bushing as in TAPER-LOCK sheaves and conveyor pulleys. Fastens securely, removes easily.

TORQUE-ARM SPEED REDUCERS
The most complete line of shaft-mounted speed reducers. Capacities: 1 to 43 hp. Output speeds: 13 to 333 rpm.

DODGE FRICTION CLUTCHES
Rolling Grip (no toggles, smooth, flexible) and Diamond D, famous for its great ruggedness and compactness. Fully enclosed. Capacities from 1/3 to 470 hp.

OF EXPERIENCE

–MAKING THE WHEELS OF INDUSTRY HUM!

For three-quarters of a century Dodge of Mishawaka has served the needs of American Industry in its ever increasing use of power. Dodge products carry power to the job—smoothly, efficiently, dependably—to keep factory wheels humming and production rolling. Dodge engineering resourcefulness has created an impressive number of "firsts" in mechanical power transmission. The skill developed through long and specialized experience has achieved a standard of quality which has earned the tribute, "if it's Dodge it's Dependable!" For news of latest developments in the mechanical transmission of power, and for qualified help in applying power efficiently and economically in your plant, call the Transmissioneer—your local Dodge distributor.

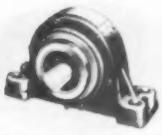
DODGE MANUFACTURING CORPORATION, 400 Union St., Mishawaka, Indiana

PILLOW BLOCKS: Roller Bearing, Ball Bearing, Babbitted. **FLANGE BEARINGS:** Roller, Ball, Babbitted. **HANGER BEARINGS:** Roller, Ball, Babbitted. **TAKE-UPS:** Roller Bearing, Ball Bearing, Babbitted. **BASE PLATES. FLOOR STANDS. DROP HANGERS. V-BELT SHEAVES:** Both TAPER-LOCK and Bored-to-Shaft size. **VARIABLE PITCH SHEAVES. BELTS:** Sealed-Life V-Belts and Flex-Link Belting. **SPEED REDUCERS:** Torque-Arm Shaft-mounted Speed Reducers. **CLUTCHES, FRICTION:** Rolling Grip, Diamond D and Solid Types. **COUPLINGS:** TAPER-LOCK Flexible, TAPER-LOCK Rigid and Flange Types. **PULLEYS:** Steel Split Transmission, Steel Conveyor Pulleys. Rubber lagging. **SAFETY-SET COLLARS. VISES:** SLIDE-SET Machinist's.

For complete line of products, types and sizes, write for bulletins and 256-page catalog.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained, he can give you valuable assistance on new, cost saving methods — and he carries a big inventory of Dodge products in stock. Look for his name under "Power Transmission Equipment" in classified telephone directories.

DODGE
of Mishawaka, Ind.



DODGE-TIMKEN ALL-STEEL BEARINGS
New. Engineered for industry's toughest jobs. Greatest endurance, with least weight. Shaft sizes 2-15/16" to 10" in stock.

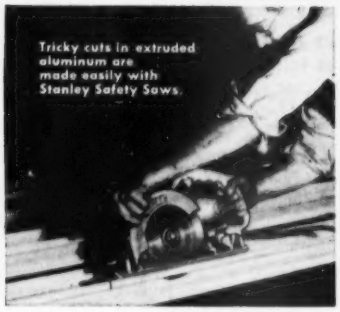
DODGE SC BALL BEARINGS
For small shafts and moderate loads. *Dependable.* The seal won't blow. A member of Dodge's famous 30,000 hour line. Shaft sizes 3/4" to 2-7/16".

DODGE SLEEVOIL BEARINGS
Quiet. Dependable. One of America's finest bearings—"tops" for fan and blower service. Sizes 1-7/16" to 8" in both plain and water cooled types.

STEEL CONVEYOR PULLEYS
Maximum strength, minimum weight. TAPER-LOCK bushing gives equivalent of a shrunk-on fit on the shaft. Diameters 6 in. to 8 ft., all face widths.

Brown Equipment & Manufacturing Co. reports . . .
"For tools that can 'take it'—

we've standardized on Stanley"



On the job from East to West . . . made by men who make tools BEST

STANLEY
Reg. U.S. Pat. Off.

HARDWARE
TOOLS
ELECTRIC TOOLS
STEEL STRAPPING
STEEL

"Hard work, rough handling day in and day out—tools must take a real beating in the building of trailer truck bodies. Our experience has proved that Stanley portable Electric Tools hold up well under these rugged conditions. They are standard equipment in all of our plants."

So reports Brown Equipment & Mfg. Co., of Westfield, Mass. — a division of the world's largest trucking concern, Associated Transport Inc. They also state that "savings made possible by using these tools have repaid their original cost many times over."

In the complete Stanley line you'll find a tough, dependable electric tool to meet every need. And you'll find one of the 35 Stanley Service Stations conveniently located near you . . . ready to provide factory-controlled service for longer tool life.

Ask your industrial distributor for a demonstration of Stanley Electric Tools. You can rely on him for expert assistance in selecting the best tool for any job. Or write for further information to: Stanley Electric Tools, 407 Myrtle Street, New Britain. Connecticut.

STANLEY *Electric Tools*

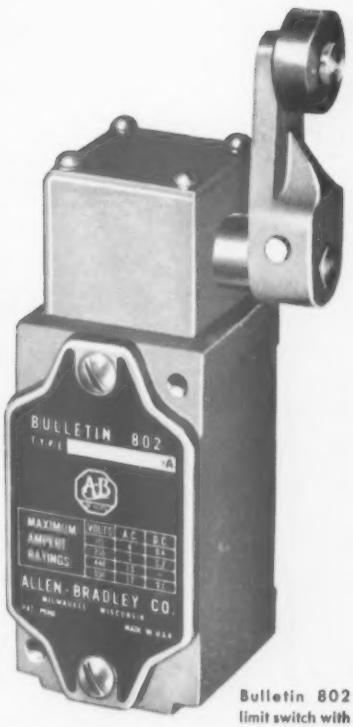
New OILTIGHT LIMIT SWITCHES

Here is a new line of remarkably compact Allen-Bradley limit switches . . . streamlined for fine appearance and built for millions of failure-free operations.

The operating heads of these limit switches may be attached to the switch body in four definite locations, each 90 degrees apart. A large selection of pushrods, lever arms, and other actuating mechanisms is available.

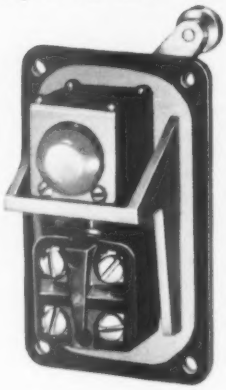
The name plate cover has a synthetic rubber gasket to exclude oil. Terminals are easily accessible by removing the cover plate. The body is threaded for ½" conduit. The switch mechanism is snap-acting, with one single pole normally open and one single pole normally closed contact, electrically separated.

The new Bulletin 802 limit switches are designed for machine tool applications. For further information send for a copy of Allen-Bradley Bulletin 802.



Bulletin 802 limit switch with roller lever

Roller lever type (Front View) for cavity mounting in machine frames



Roller lever type (Rear View) showing terminals for n.o. & n.c. contacts

ALLEN-BRADLEY
QUALITY
LIMIT SWITCHES

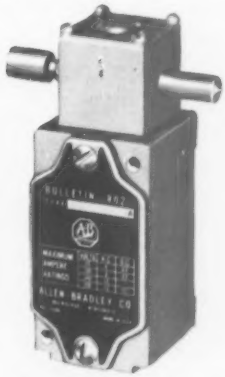
A-B Quality

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wisconsin

Pushrod limit switch with roller for vertical motion of the pushrod

Pushrod limit switch without roller—cover off to show terminals

Pushrod limit switch designed for horizontal motion of the pushrod



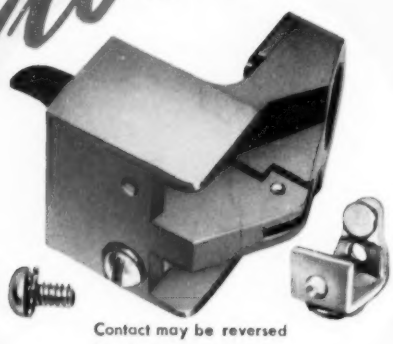
Pushrod limit switch with side pushrod and maintained contacts

Lever operated limit switch with a long and flexible operating rod

1-53-MR

Extra! Handy Auxiliary Contacts

for all Allen-Bradley Sizes 0 and 1 Solenoid Controls



Contact may be reversed by removing one screw

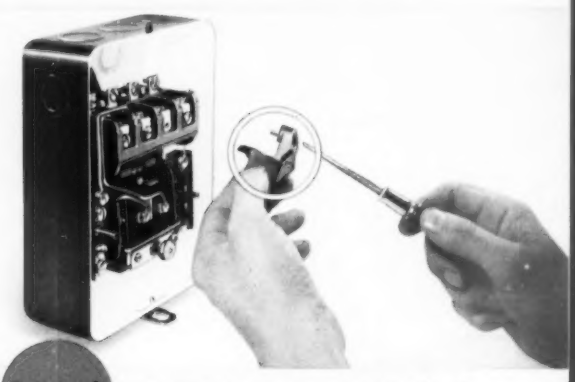
Do you want to add one or more extra pilot contacts to some of your Allen-Bradley solenoid switches . . . to operate indicator lights, relays, or other starters?

These new, compact auxiliary contacts can now be added to the arc hood of any and all standard sizes 0 and 1 solenoid switches. The operating arm of the auxiliary contact is actuated by the up and down motion of the solenoid plunger of the switch to which it is attached.

Write for descriptive literature.

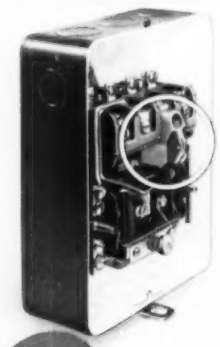
SO SIMPLY APPLIED

First Remove the terminal screw from the stationary contact block of the Allen-Bradley starter.



Second Insert terminal screw into mounting hole of auxiliary contact to be attached to starter.

Then Screw terminal screw into stationary contact block and fasten auxiliary contact to starter.



Ready to Wire Allen-Bradley auxiliary contact is now ready to be wired for any auxiliary pilot circuit.

Auxiliary Contacts easily changed from n.o. to n.c. operation

The new Allen-Bradley auxiliary contact may be instantly changed from n.o. to n.c. contacts. Removal of one screw permits the instant reversal of the contacts in the contact block. There are no small parts to lose.

1-53-MR

These auxiliary contacts are available for all Allen-Bradley sizes 0 and 1 controls, including contactors, reversing switches, combination starters, Bulletin 709 solenoid starters, and Bulletin 609 manual starters.

Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wisconsin

ALLEN-BRADLEY
QUALITY
SOLENOID CONTROLS

At the new Crown Zellerbach Plant in San Leandro, Calif., Matthews Conveyor Co. used Drive-It "400", heavy duty fastening tool, to anchor conveyor machinery to concrete floors. Drive-It also was used to fasten electrical work, plumbing, and partition sleepers to concrete and steel by Swinnerton and Walberg Company and sub-contractors.

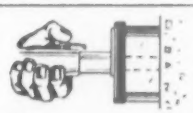
split-second fastening to concrete steel

Drive-It uses a small powder load to drive hardened steel pins into concrete or steel. No power lines! No drilling!

UL

DRIVE-IT, the *first* powder actuated tool approved by Underwriters' Laboratory.

DRIVE-IT cannot be discharged accidentally due to the push and turn sequence. This, plus the large safety pad makes *DRIVE-IT* triple safe.



Exclusive Automatic Barrel Extension for fastenings inside junction boxes or other recesses.

DRIVE-IT is the only powder-actuated tool which requires but one standard power load regardless of penetration desired.

Exclusive Swivel Safety Pad easily rotated for getting into close quarter work.

DRIVE-IT "300", lowest cost fastening tool. Low original cost and low operating cost.

OVER 50 TYPES AND SIZES

MAIL THIS COUPON TODAY!

POWDER POWER TOOL CORP.

7526-G S.W. Macadam Ave., Portland 1, Oregon

Canada: Ammo Power Tool Co., Ltd.
735 Broadway, Vancouver, B. C.

☐ Please send FREE catalogue and literature.
☐ I want a FREE demonstration of *DRIVE-IT*.

Name_____

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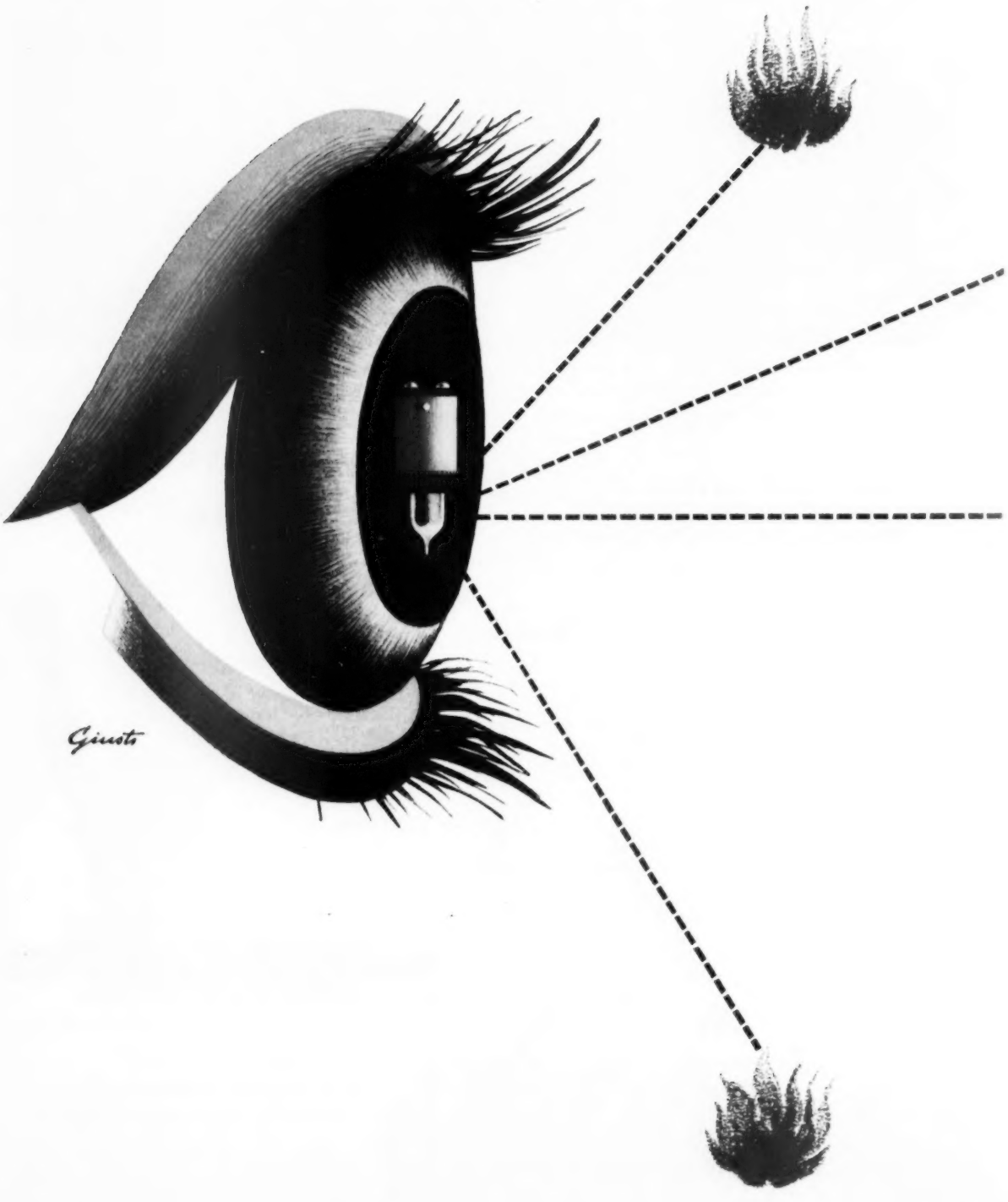
City_____ State_____

Meet the instantaneous



fire detector...

fireye

"sees" fire with the speed of light

Here for the first time is a detector that "sees" flame instantly, and gives warning without waiting for smoke or rising heat. For *Fireye*, with its completely self-supervising electric-eye principle reacts with the speed of light, automatically, infallibly.

The importance of those first, few vital seconds—the period where delay can be costly and tragic—establishes the importance of *Fireye*, the fastest-known flame-detection system.

10,000 square feet protected with a single system of six eyes! Each eye scans a full hemisphere and protects an entire 40 x 40 foot room or area. Multiple systems provide complete coverage of any size areas.

Alarms or any extinguishing systems may be operated by *Fireye* detectors.

● *Chosen for the Atomic Energy Plant* in Savannah River, Georgia — chosen increasingly by others for important critical locations—you'll find *Fireye* Systems becoming the preferred fire detectors wherever equipment, materials or processes represent a high concentration of value in a hazardous area.

Are you sure of your fire protection? With Fireye you really know!

Fireye is its own policeman—automatically supervising every electronic component part—automatically and *continuously* reporting on the job by the constant flashing of a pulse light on the control panel—automatically discriminating against other light.

A failure in any part of the system is indicated immediately by the trouble light and an audible trouble signal . . . so *with Fireye you know your fire detection system is on the job—not just on the premises!*

fireye

Let Us Demonstrate In Your Office!

Take only 20 minutes of your time, and let us convince you that *Fireye* is the fastest and most remarkable flame detection system today!

MAIL THIS COUPON TODAY.

FIREYE CORPORATION, Dept. F-2
720 Beacon Street, Boston 15, Mass.

Please supply me, without obligation, all the facts about *Fireye* Protection Systems, as follows: (Check one)

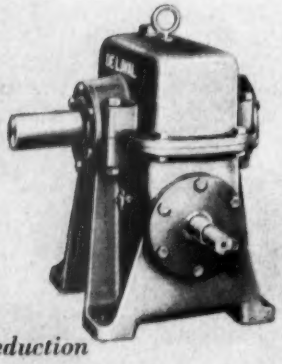
LITERATURE ☐ DEMONSTRATION ☐

Name_____ **(Title)**_____

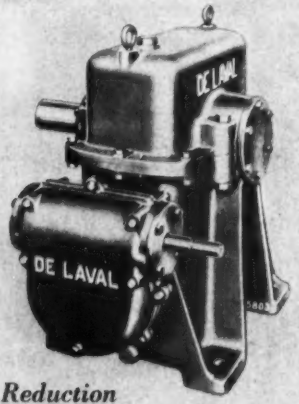
Address_____

Company_____

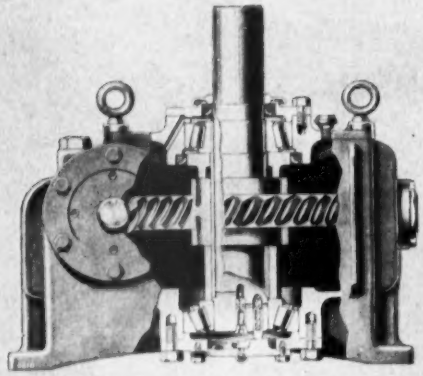
DE LAVAL WORM GEARING *is designed for quality products*



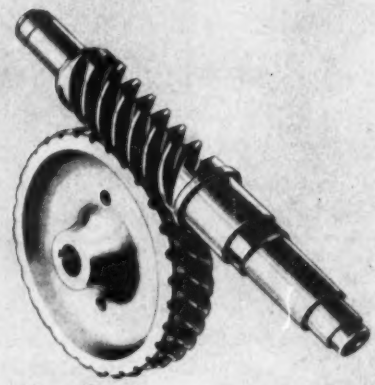
1. *Single Reduction*



2. *Double Reduction*



3. *Vertical*



4. *Worm Gear Sets*

De Laval heavy-duty worm gear speed reducers take punishment year-in, year-out . . . need little attention even under the most rugged operating conditions. The right angle drive is a great space-saver. High ratio reduction permits use of efficient high-speed motors and turbines for driving many types of industrial machinery. Whatever you manufacture — if you use speed reducers—remember De Laval Speed Reducers are . . . *built to be built-into a quality product.*

1. *Horizontal* units in single reduction ratios of 3:1 to 100:1, fractional to 265 hp and 3″ to 20″ center distances. *Send for Catalog G-WBV.*

2. *Double Reduction* units are available — both horizontal and vertical arrangement—and in helical-worm and double worm design. Ratios up to 6400:1 and hps to 56. *Send for Catalog G-WWH.*

3. *Vertical* units in single reduction ratios of 3:1 to 100:1, 5 to 210 hp and 4″ to 18.11″ center distances. *Send for Catalog G-WBV.*

4. *Worm Gear Sets* are available in 3:1 to 100:1 ratios, fractional .1 to 550 hp and 3″ to 30″ center distances. A wide variety of standard sets are immediately available. Sets to individual specifications can also be furnished. *Send for Catalog G-WGS.*

DE LAVAL *Speed Reducers*

DE LAVAL STEAM TURBINE COMPANY
804 Nottingham Way, Trenton 2, New Jersey

DL 1958A

Heller NUCUT files

do two jobs at every stroke!

Two distinct sets of teeth make possible double-action filing at every stroke. The coarse teeth cut clean, deep, true without scraping or skidding. On the same stroke, the fine teeth leave the work surface sleek and smooth. Order through your local distributor.

Why the BullDog trademark identifies

Reprints of this thoroughbred bulldog, by the famous artist Durenceau, will be sent upon request. No cost or obligation. Address: BullDog Electric Products Company, Dept. FM23, Detroit 32, Michigan.

the best in electrical equipment

If there is one thing which distinguishes BullDog electrical distribution equipment, it is the unmistakable evidence of the *thoroughbred.*

This goes far beyond merely competent product performance. It touches every phase of the product . . . its appearance, its economy, its ease of handling, its durability, its operating convenience.

Because of this emphasis on total product excellence, BullDog products stand apart. In BullDog Safety Switches, Pushmatic Electri-Centers, Panelboards, Trol-E-Duct, BUStribution Duct, and all others, you see the evidence of the product thoroughbred. Through *integrated design,* all components of each BullDog product work together in perfect harmony . . . for the fullest efficiency, performance, usefulness, economy and long life.

Keep these things in mind when you specify or buy electrical distribution equipment. Look for the BullDog symbol on the products you buy. Our adherence for 50 years to this manufacturing ideal makes BullDog equipment, by all odds, your finest buy.

* * *

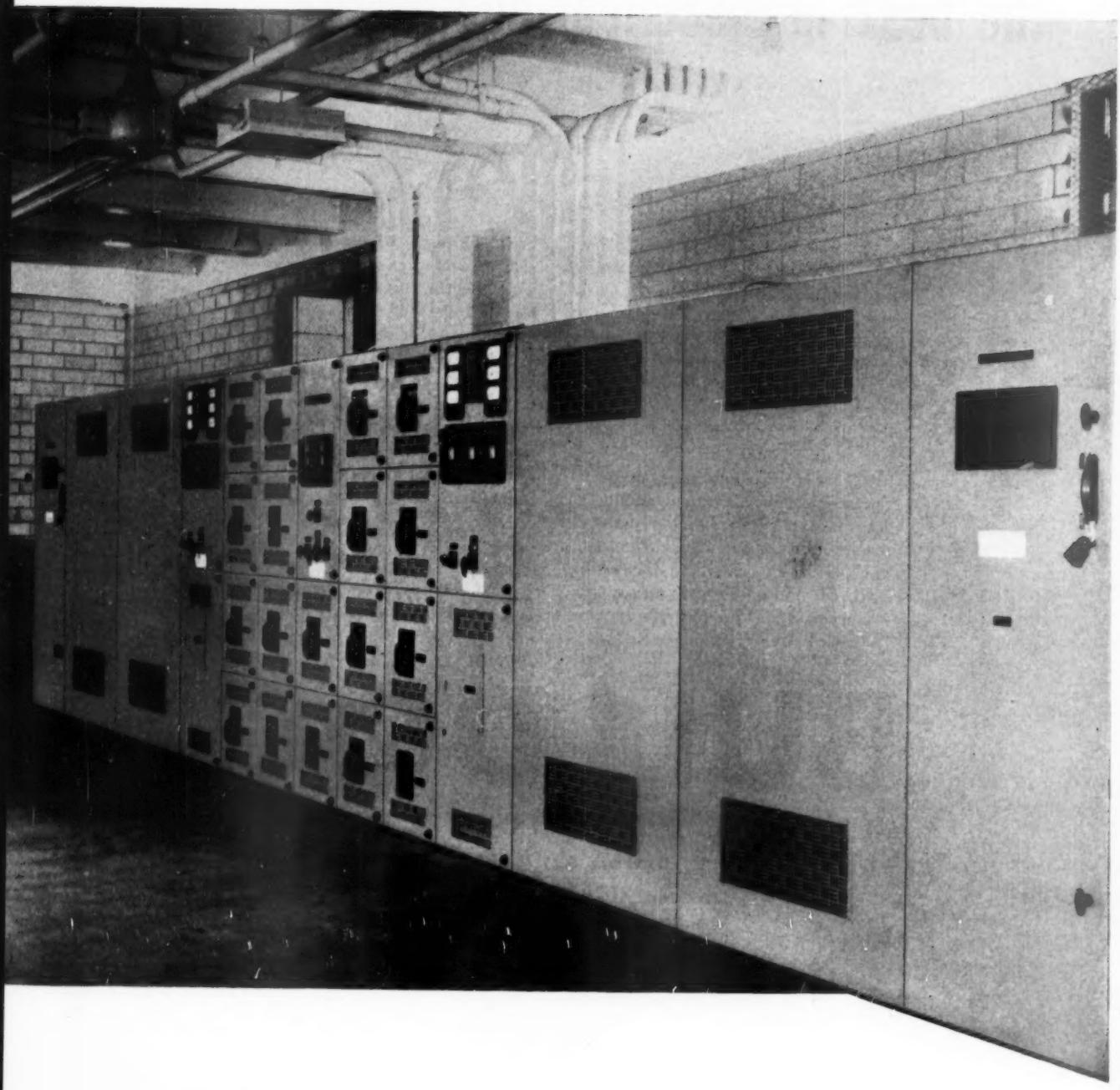
For on-the-job assistance in planning your electrical distribution systems, call in a BullDog Field Engineer.

BULLDOG

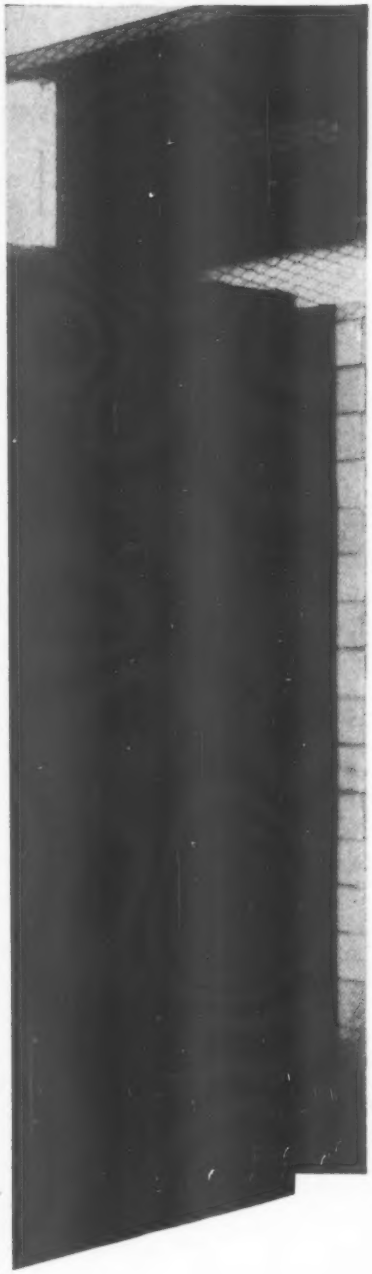
ELECTRIC PRODUCTS COMPANY

Detroit 32, Michigan

THOROUGHBRED IN ELECTRICAL EQUIPMENT



Westinghouse *POWER CENTERS* provide for efficient power distribution at Eastman Kodak



Westinghouse Power Centers consisting of dry-type transformers and switchgear are serving the modern power distribution system at Eastman's Kodak Park Works at Rochester, N. Y. Here's how this user rates their performance in this key function.

> *"In recent years, a number of Westinghouse Power Centers have been installed at the Kodak Park Works. These units all have ASL dry-type transformers and are supplied at either 2,400 or 13,800 volts. Capacities range from 300 kva to 1,500 kva. Maintenance has been nominal and no serious trouble of any kind has been experienced. We are well satisfied with the equipment."*

Many specific advantages of Westinghouse Power Centers contribute to such approval of these installations. For example . . .

They cost less to maintain . . . no liquids to test, recondition or replace . . . no gaskets, valves or gauges. All parts are readily accessible.

They're more economical . . . because they eliminate the need for costly vaults and can be located near the center of load . . . resulting in shorter secondary circuits, lower line losses, better regulation.

They're safer . . . from the hazards of fire and explosion; they have no exposed live parts. Breakers and switches have positive interlocking mechanisms, each in its separate compartment.

GET THE COMPLETE STORY

Westinghouse Power Centers provide better service continuity, greater flexibility, better regulation . . . all the things that contribute to efficient power distribution. Most important, they provide the simplest, lowest-cost way of attaining the power system that best meets your operating requirements.

Booklet B-4162 covers Westinghouse Power Centers in detail. Booklet B-4045 discusses various types of plant distribution systems wherein power centers offer maximum advantage. Contact your Westinghouse Representative or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-60765

YOU CAN BE SURE OF

Westinghouse

POWER CENTERS

Latest type Cooper-Bessemer 1500 hp opposed-action air compressor, installed in Boeing's Research Laboratory, Seattle. Capacity is automatically, accurately controlled at any discharge pressure up to 295 psig.

Modern air power on land

HELPS GAIN NEW POWER IN THE SKY!

HERE are two kinds of air power—Boeing's amazing new B-47 Stratojet, shown in a Jato takeoff, and a modern Cooper-Bessemer motor-driven air compressor. Installed in Boeing's Research Laboratory almost a year ago, this big compressor supplied air under pressure for testing many of the B-47 parts, will go on year after year contributing to Boeing's broad development program.

The latest Cooper-Bessemer compressor developments offer new advantages, new economies to plants everywhere . . . wherever air is a tool. For example, modern opposed-action design means greater space-saving compactness, vibration-free operation, higher efficiency, and longer life with less maintenance.

So when it comes to air or power, it will pay you to write for the latest Cooper-Bessemer bulletins. Find out about the *new* things being done by one of America's *oldest* builders of engines and compressors.

The Cooper-Bessemer Corporation

MOUNT VERNON, OHIO — GROVE CITY, PA.

New York • Chicago • Washington • San Francisco • Los Angeles • San Diego • Houston • Dallas • Odessa • Pampa • Greggton • Seattle • Tulsa • St. Louis • Gloucester • New Orleans • Shreveport
Cooper-Bessemer of Canada, Ltd., Halifax, N. S.

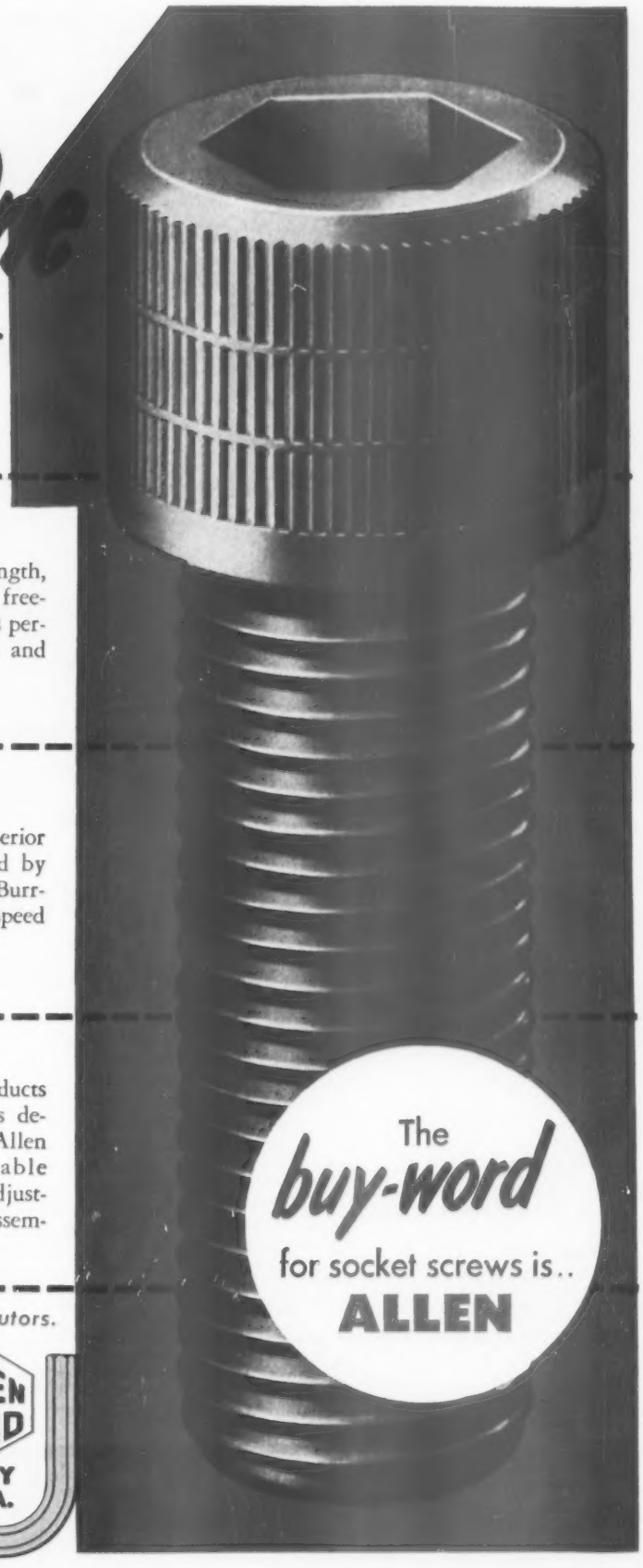
DIESELS • GAS ENGINES • GAS-DIESELS • ENGINE-DRIVEN AND MOTOR-DRIVEN COMPRESSORS • HIGH PRESSURE LIQUID PUMPS

The

Number One

name in socket screws..

ALLEN



with design engineers...

No. 1 because Allen's greater strength, greater holding power and freedom from projecting heads permit more compact design and smooth, safe surfaces.

on the production line...

No. 1 because Allen O Heads' superior uniformity is maintained by statistical chart control. Burr-free threading and keying speed assembly time.

with the end user...

No. 1 because Allen O Screw products identify equipment that is designed right, built right. Allen screws, with more durable threads and sockets make adjustments, disassembly and reassembly easy and trouble-free.

. . . Sold only through leading distributors.

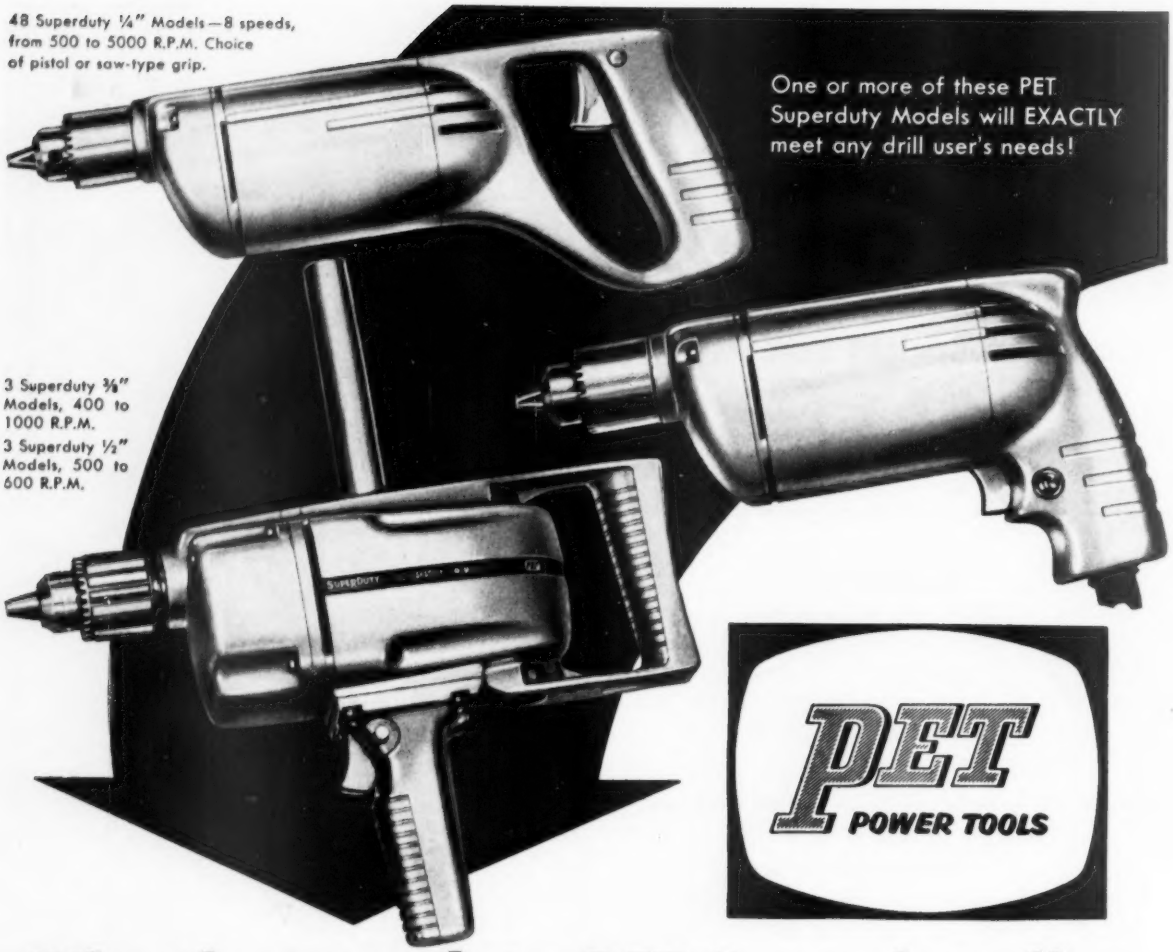
The *buy-word* for socket screws is..
ALLEN

ALLEN ALLEN HEAD
MANUFACTURING COMPANY
Hartford 2, Connecticut, U. S. A.

48 Superduty ¼" Models—8 speeds, from 500 to 5000 R.P.M. Choice of pistol or saw-type grip.

3 Superduty ⅜" Models, 400 to 1000 R.P.M.

3 Superduty ½" Models, 500 to 600 R.P.M.



One or more of these PET Superduty Models will EXACTLY meet any drill user's needs!

PET POWER TOOLS

Why the complete PET Superduty line offers you the right drill for *YOUR* job!

Any maintenance or production man will agree that the right drill for the right job means three things: better work, greater efficiency and longer drill life. So why compromise on a drill that's "almost" right?

PET Superduty Drills are available in 54 separate and distinct models . . . the various speeds and rated power have been carefully selected on the basis of what industrial users have needed and asked for. Result? You get a wide selection . . . and end up getting the drill that's *exactly right for your work*.

And, a wide selection isn't the only thing you'll like about the PET Superduty line. Just plug in one of these drills: feel the vibration-free power as it flows from a dynamically-balanced armature through precision-cut gears. Then you will know you've found a drill that will stand up in rugged service day in and day out—and still come back for more!

For complete details on the best in electric drills—sold at prices that will come as a pleasant surprise—find out the name of your nearest PET Distributor. Write today, to Portable Electric Tools, Inc., Dept. FM-23, 320 West 83rd St., Chicago 20, Ill.

Be sure to ask for this free catalog!

Compare these quality drills for yourself . . . model by model, feature by feature. This illustrated catalog gives you the complete story. Free copy by return mail.

The features you want are the features you get—in PET Superduty Drills

- **Reserve Power; for the extra-tough job**
- **Heavy-Duty ball and needle bearings**
- **Precision-Cut, Heat-Treated Gears; for smooth, quiet power flow**
- **Dynamically Balanced Armatures; for freedom from vibration**
- **Forced Ventilation; for cool running**
- **Aluminum Alloy Die Castings; for light weight, easy handling**
- **Compact Design; makes hard-to-reach drilling jobs easier and faster**
- **Meet U. S. Government and Military Specifications**

PET POWER TOOLS

PORTABLE ELECTRIC TOOLS, INC.

320 West 83rd Street, Chicago 20, Illinois

In Canada: Portable Electric Tools, Ltd., Toronto, Ontario

INDIVIDUALLY PLANNED motor control centers are manufactured and delivered completely wired and ready-to-install from this new General Electric motor control center production line.

EASY TO INSTALL, inspect, and interchange starters, which are assembled as complete units, including pushbuttons and wiring terminals for easy front-connecting. Door swings more than 90°

New G-E Motor Control Center Has Easiest-to-Interchange Units

The new General Electric motor control center is the most up-to-date equipment for the centralized control of a-c motors up to 200 horsepower. Each control center is planned for the job it is to handle, but it can rapidly be modified to meet changed requirements. Standard units can be easily interchanged or substituted, new units can be quickly added. Units may be mounted back-to-back in same standard enclosure. Master terminal boards may be located at either top or bottom of cabinet.

ACCESSIBLE. Installation is simple—just a matter of sliding the unit into its compartment. Stab-on connectors grab the vertical bus. Wiring is easy because even pushbuttons and terminals are mounted on the unit frame for simple front-connecting. Doors swing more than 90°, so unit can be lifted out of compartment for accessibility from all sides. Barriers between units can be slipped out, making a four-inch wiring trough. Master terminal boards can be swung out of place for connecting without "fishing" of wires.

FOR MORE INFORMATION, contact your nearby General Electric apparatus sales office, authorized G-E agent or distributor, or write Section 781-1 for GEA-4979A today. *General Electric Company, Schenectady 5, New York.*

HIGH-POTENTIAL TESTS are made of each completed General Electric control center before shipment, to assure adequate short-circuit protection, safety for plant personnel and equipment.

You can put your confidence in—

GENERAL ELECTRIC

CLARK MASTER SWITCHES

for every type of
MILL AND CRANE SERVICE

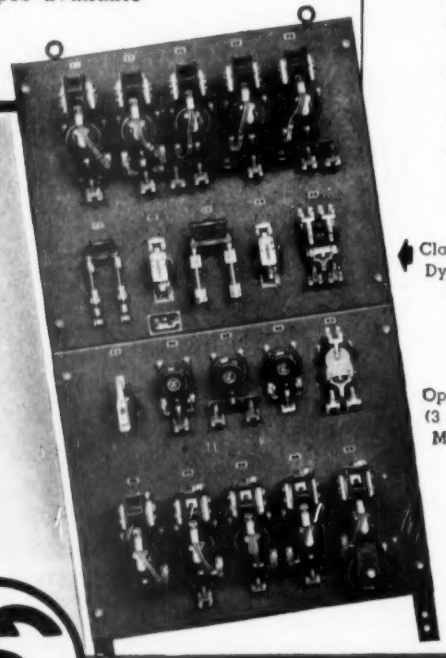
Bulletin 101, Type RD
Mill Master Switch

- Weatherproof enclosure is standard
- Dust-tight and water-tight enclosures available
- Sizes – 3 cams, 6 circuits
  6 cams, 12 circuits
  9 cams, 18 circuits
- Spring return available through a maximum of 14 circuits
- Mechanical latch at "off" point available
- Electrical interlock handle switches, and pedestal-mounted types available

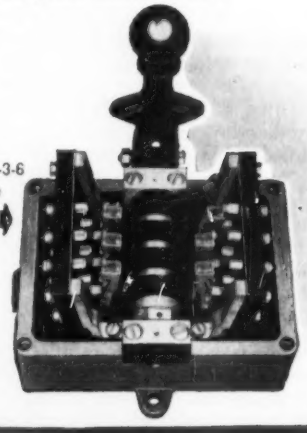
CLARK Bulletin 101-RD Master Switches have been delivering maximum service in all types of heavy-duty, rough-and-tumble mill and crane applications for 14 years.

Maintenance is kept to a minimum by mounting the main shaft needle roller bearings in brass blocks. Contact finger bearings are oil-impregnated and the cam roller is made of hardened drill rod. Double-break contacts are alloy silver, requiring no dressing. High-impact Bakelite operating cams with square holes, are mounted on the square shaft, and a large nut locks steel spacers and cams to maintain their lateral positions.

Consult our nearest District Office for complete information.



Clark Bulletin 9135
Dynamic Lowering
DC Crane Hoist
Controller



Open View, Type RD-3-6
(3 points — 6 circuits)
Mill Master Switch

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL • 1142 EAST 152ND STREET, CLEVELAND 10, OHIO

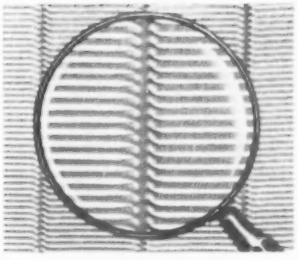
KAISER ALUMINUM SHADE SCREENING covers 10,000 square feet of windows on 7 buildings of Lockheed Aircraft Corporation's Burbank, California plant. Interiors are glare-free, far cooler, more comfortable for work. Reduces worker fatigue; improves morale. Notice how this screening assures a smooth band of windows, resulting in a modern, beautiful facade.

BEFORE Kaiser Aluminum Shade Screening . . .

AFTER Kaiser Aluminum Shade Screening

KEEP INTERIORS UP TO 15° COOLER!

. . . at surprisingly low cost



Now you can get low-cost relief from the sweltering summer sun—with Kaiser Aluminum Shade Screening. Here's how this remarkable cooling device works:

◀ Thousands of small horizontal louvers, permanently tilted at a slight downward angle, block the hot sun's rays outside the window. Result: Rooms up to 15° cooler, glareless light and indoor shade; protection against insects. Air circulates freely. Daytime privacy assured because outsider's view is blocked, although you can see out.

Cuts air conditioning costs

Even without air conditioning, Kaiser Aluminum Shade Screening gives low-cost protection against summer sun. Where new air conditioning is planned, substantial savings are often possible through use of smaller units. Existing units operate less often—more economically. Kaiser Aluminum Shade Screening does the work of venetian blinds, awnings, and ordinary screens at less than the cost of awnings alone! Requires minimum maintenance. Durable, high grade aluminum, can't rust—won't cause ugly red streaks on buildings. Never needs painting.

ACT NOW! Send coupon below for free sample demonstrator.

Kaiser Aluminum

SHADE SCREENING

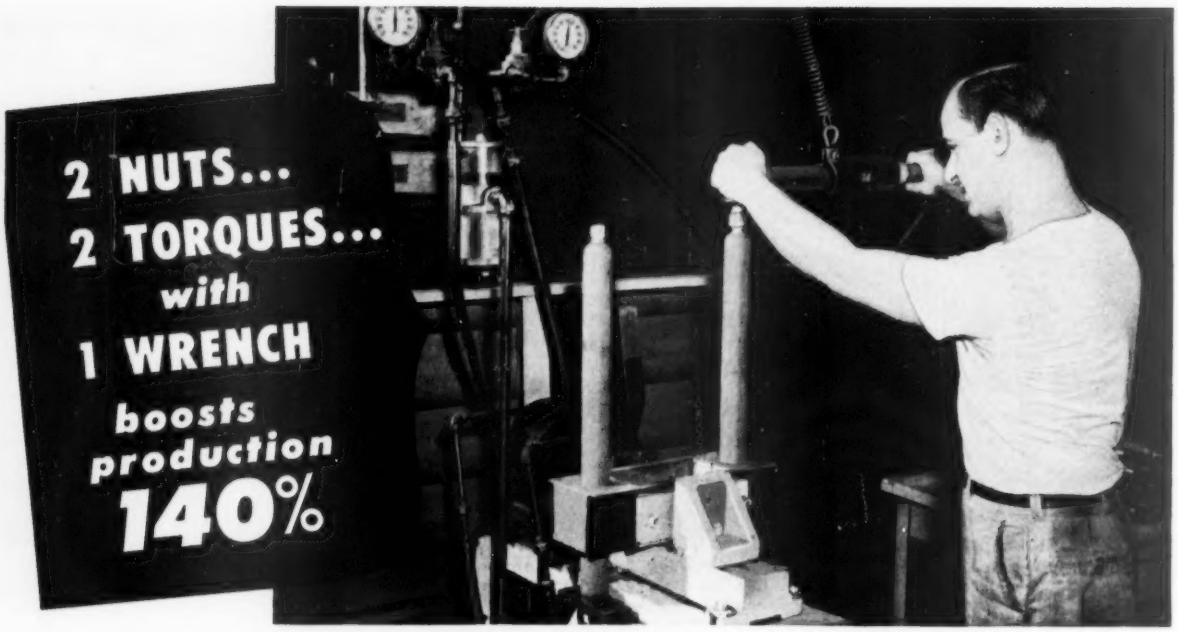
FREE DEMONSTRATOR! Actual sample of Kaiser Aluminum Shade Screening shows how it blocks sun rays. Full information and name of your nearest dealer included. Mail coupon now!

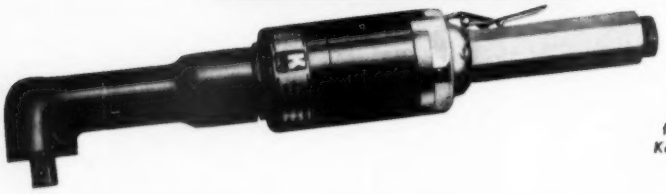
KAISER ALUMINUM & CHEMICAL SALES, INC.
Consumer Service Division
252 Kaiser Bldg., Oakland, California

Name_____

Address_____

City_____ State_____





KELLER 16C NUT SETTER

This is the tool used for assembling fire extinguishers as shown in the large illustration. Send for Bulletin No. 613 describing this and other Keller pneumatic screw drivers and nut setters.

Ingenious application of Keller 16C Nut Setter boosts output from 22 to 53 units per man-hour

At one end of a cylindrical fire extinguisher is a threaded safety plug. At the other, a threaded release valve. Each must be tightened accurately to a different torque.

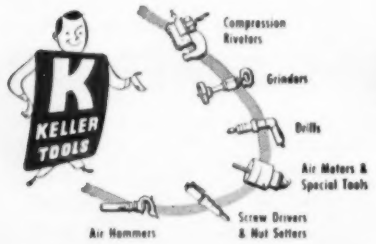
Formerly each cylinder was clamped in a vise while two men hand-torqued the fittings. Their combined output was 44 units an hour—22 per man-hour.

The present assembly method is illustrated above. Fittings for two cylinders are started by hand, and the safety plugs set into built-in table sockets. Then pressure on a pedal valve closes the vise on the two cylinders, and at the same time sets the line air pressure at 52 psi. The Keller wrench is applied, automatically running down the release valves at the top of the cylinder to 550 in./lb torque.

Opening the vise with the pedal valve also changes the air pressure to 22 psi, so that a second application of the wrench rotates the whole cylinder and tightens the safety plug at the bottom to exactly 100 in./lb torque.

With this equipment, one man now assembles 53 units an hour—240% of the former production rate.

Perhaps your near-by Keller application engineer can help YOU make substantial savings in production time. Have you talked with him lately?

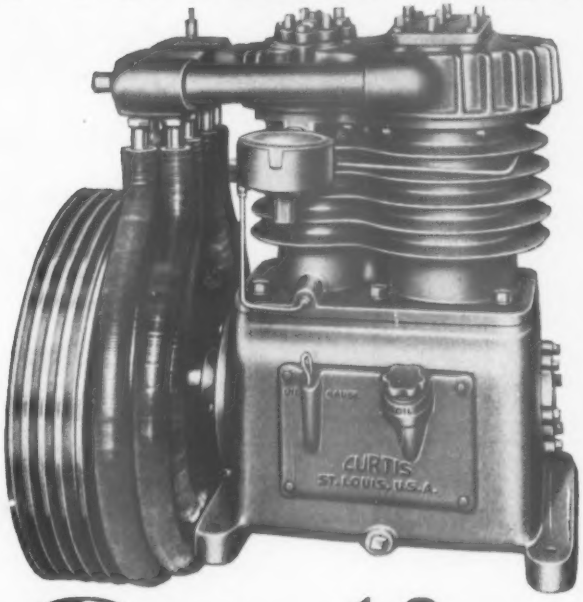


KELLER
Pneumatic Tools

KELLER TOOL COMPANY, GRAND HAVEN, MICH.

MORE AIR Per Horse Power

- IT'S TWO-STAGE
- IT'S AIR COOLED
- SELF OILING



The New Curtis

MODEL 98 AIR COMPRESSOR

TWO-STAGE AIR COOLED 15 AND 20 HORSEPOWER

TWO-STAGE — More air per kilowatt hour, assuring savings in power bill.

AIR-COOLED — No expensive water bills; eliminates plumbing installation costs.

INTERCOOLER — Four section, finned, providing unusually effective cooling between stages; cooled by cyclone of air from fan flywheel.

SELF OILING — Simple, positive centro ring method; provides pressure lubrication of connecting rod and pistion pin bearings.

TWO TIMKEN MAIN BEARINGS — Tapered rollers; provide easy adjustment made externally without dismantling compressor.

VALVES — Readily removable as assembled units without removing cylinder head or breaking pipe connections or gasket joint.

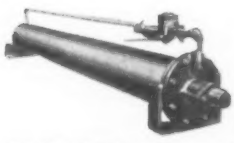
CRANKSHAFT — Counterbalanced, drop forged — two main bearings — no overhung bearing.

PRECISION WORKMANSHIP — Assures long life and minimum maintenance.

EXPERIENCE — Backed by 99 years of manufacturing — assures you dependable, troublefree service.

Available as a simple compressor or base mounted — motor driven.

LET ONE MAN DO THE WORK
with this Curtis air-operated equipment.



AIR CYLINDERS — for almost any pushing, pulling or hoisting operation.

AIR HOISTS — for low-cost lifting or lowering of materials or machines.

-726

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Co.
1995 Kienlen Avenue, St. Louis 20, Mo.

I am interested in items checked below:

☐ THE NEW MODEL 98 ☐ AIR HOISTS ☐ AIR CYLINDERS
☐ AIR COMPRESSOR

Name.....

Firm.....

Street.....

City.....Zone....State.....

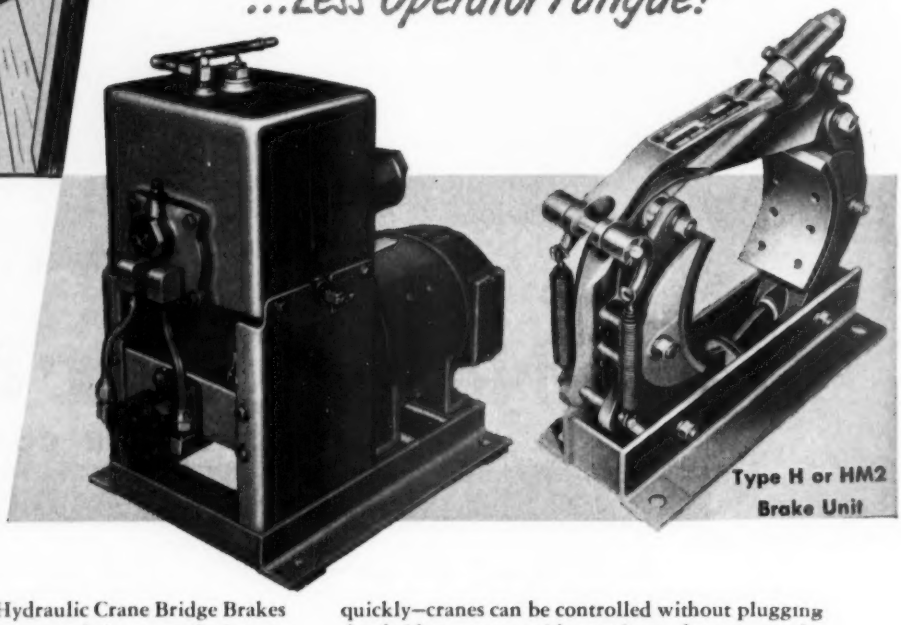
CURTIS PNEUMATIC MACHINERY DIVISION of Curtis Manufacturing Company

1995 KIENLEN AVENUE ST. LOUIS 20, MO.

Now... Wagner Powered Hydraulic Crane Bridge Braking

for safer, more efficient Crane operation

...More Torque ...Greater Capacity ...Less Operator Fatigue!



Hydraulic power unit driven by totally-enclosed motor

Type H or HM2 Brake Unit

These new *Powered* Hydraulic Crane Bridge Brakes mean that your operators can bring even the largest crane to a safe, smooth stop at the touch of a toe. Loads can be spotted accurately—production can be stepped up—several brakes can be operated from one pedal—*all with less operator fatigue!*

Wagner Powered Hydraulic Braking Systems are designed for applications where frequent starts and stops are necessary . . . where close spotting is used . . . where large heavy equipment is involved . . . and for applications where exceptional ease of brake operation is desired.

Wagner Powered Braking Systems mean longer life for your equipment . . . Operators have less tendency to drag brakes and thus wear out wheels and lining quickly—cranes can be controlled without plugging the bridge motor with resultant damage to the motor and gears.

Wagner powered units can be added to your present Wagner Hydraulic Bridge Brake System. Investigate this new method of braking today—write for Bulletin IU-36 which fully explains and describes Wagner Powered Hydraulic Braking.

Replacement Lining and Brake Wheels

Wagner offers the perfect combination of brake wheel and non-scoring lining for replacement needs. Wagner Brake Lining is specially designed and manufactured to meet the exacting service requirements of industrial braking. It is available in rolls, blocks, and discs.

®Wagner Electric Corporation EST. 1891

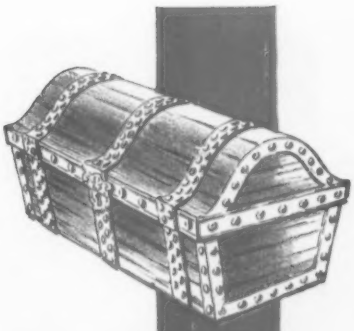
WAGNER ELECTRIC CORPORATION
6412 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS – AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

152-3

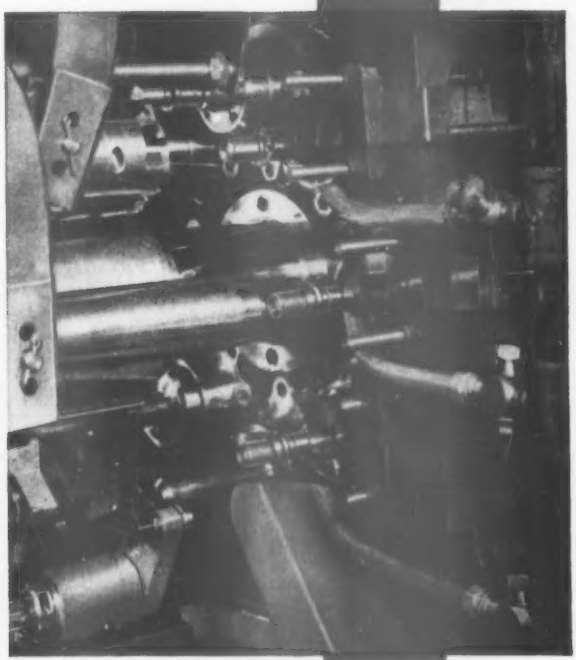
PIECES FROM EIGHTS



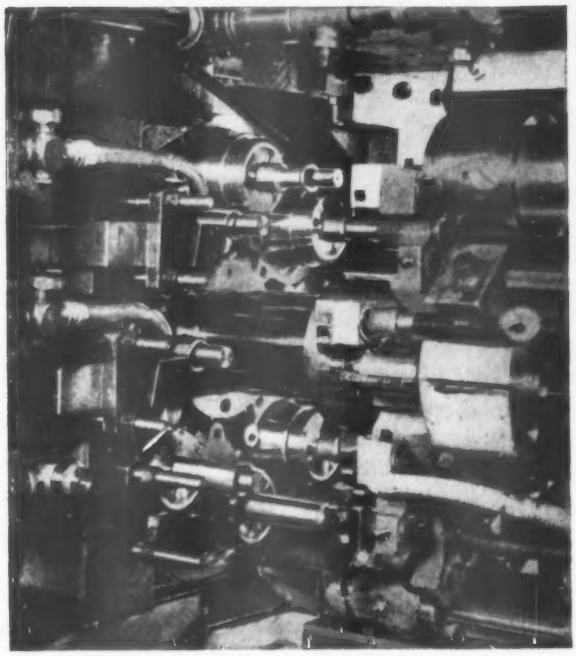
The first eight spindle bar automatics were introduced in 1930 by the late Frank L. Cone, founder of the Cone Company.

CONOMATIC Eights have had the usual opportunities available to any production tools that can handle added requirements and responsibilities.

With more tool positions than other "automatics", Eight Spindle CONOMATICS have an advantage in taking on, at one chucking, operations that save the costs of second handling.



Rear Side of Tooling Area

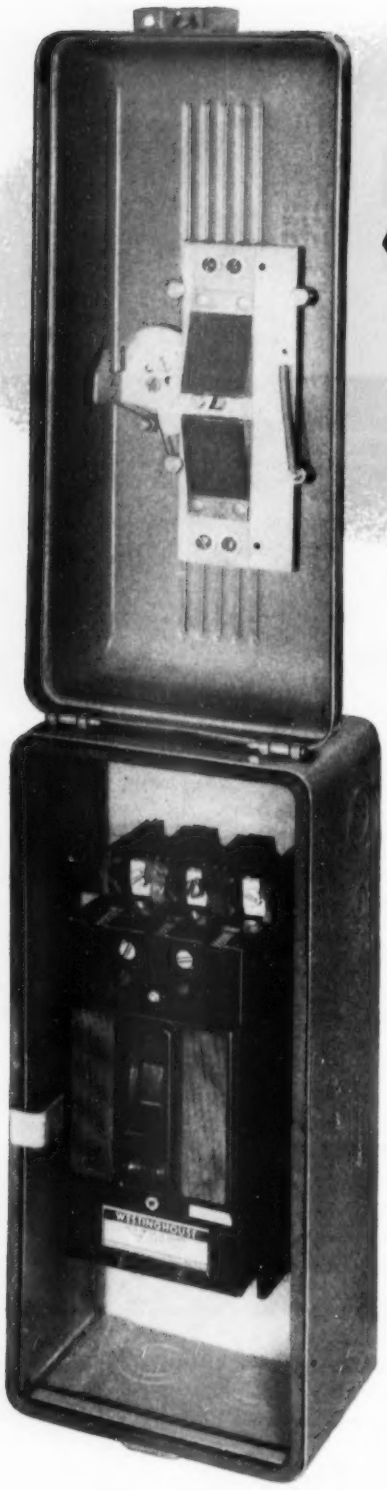


Front Side of Tooling Area

The milling and stamping operations performed by the 1⅝-EIGHT, on the piece shown, did not require stopping the spindle. The dependable performance of CONOMATICS makes such money-saving operations well worthwhile.

A Comparison of ALL Automatics is in favor of Cone

Conomatic } CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.



Restore service in seconds

WITH AB-I CIRCUIT BREAKERS

AB-I Circuit Breakers require no replacement parts, can be safely "Reset" by anyone in seconds after a fault is cleared.

Production down time is minimized, valuable man and machine hours of work are saved as a result.

After a fault is corrected, a workman simply turns the breaker handle to "Reset" and back to "On" to restore service. He isn't exposed to "live" parts, and should the fault continue, the breaker merely trips again. Trip free, it cannot be held closed against a fault.

AB-I Circuit Breakers give complete protection against short circuits and overloads, yet ride out harmless temporary overload peaks. Mechanism is quick-make, quick-break. Calibration is factory set and sealed; stays exact and tamperproof for the life of the installation. Outstanding "De-ion®" Arc Quenchers extinguish arcs in 1/120 of a second.

Find out how AB-I Breakers can save you time and money. Call your Westinghouse Distributor or write for B-5456, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

J-30093

"Of course, circuit breakers save money."

YOU CAN BE SURE...IF IT'S

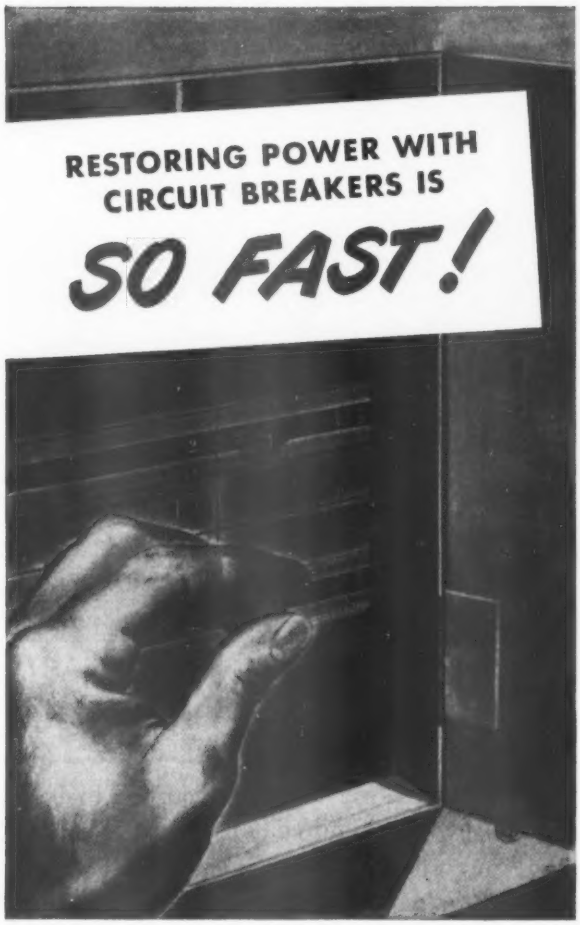
Westinghouse

APPARATUS DISTRIBUTOR WESTINGHOUSE

AB-I Circuit Breakers

THE COMPLETE LINE

Save with SAFER... SURER AB BREAKERS



The blow that often hurts worse than a power outage is inability to get back into production. With one investment you can have reliable circuit control and protection, and help in eliminating road blocks to capacity production—with Westinghouse Circuit Breakers.

On short circuits, Westinghouse Breakers trip instantly, yet provide a time lag on temporary, harmless overloads to minimize circuit interruptions. As soon as trouble is cleared on the line, flip the handle back to "on" position and power is restored—just as quick as that. No need to chase fuses, no costly maintenance time to install them. In addition, Westinghouse Breakers are tamperproof—provide you dependable protection for years and years without attention.

Westinghouse has a complete line of Circuit Breakers for industrial and commercial applications in ratings from 5 through 600 amperes. For complete information, call your nearest Westinghouse office, or write for Bulletin D. B. 29-060, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-30052

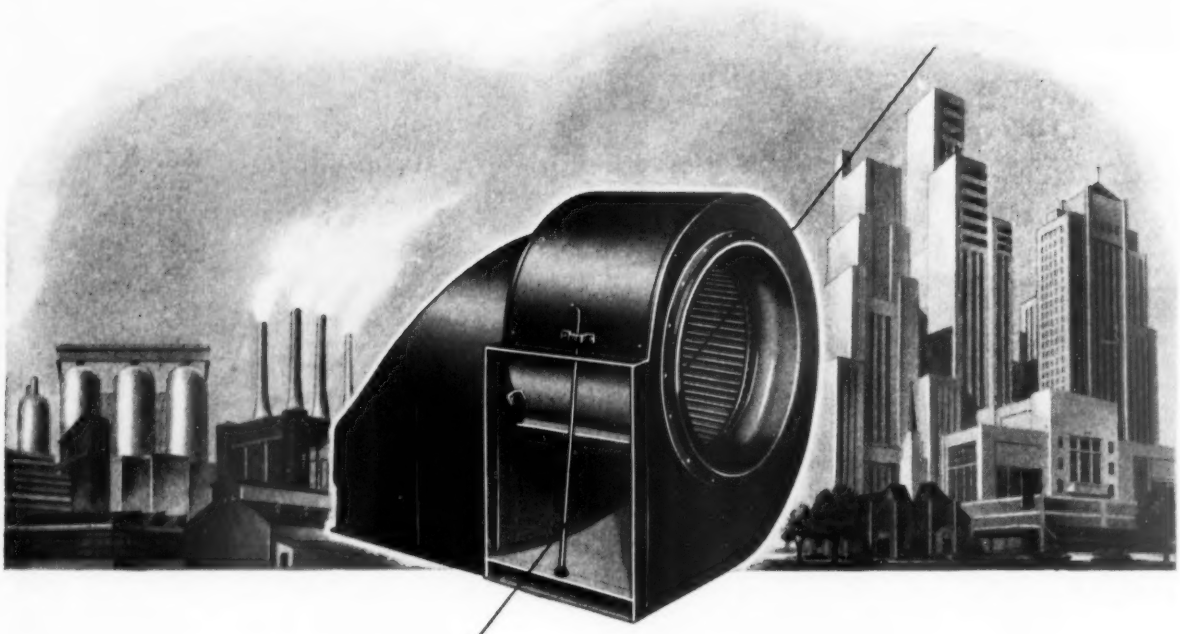
DESIGN TESTED AND VERIFIED IN THE Westinghouse HIGH-POWER LABORATORY

YOU CAN BE SURE... IF IT'S Westinghouse

AB CIRCUIT BREAKERS

THE COMPLETE LINE

AMERICAN BLOWER
Utility Sets



The heart of an American Blower Utility Set is this dynamically balanced Sirocco wheel which provides large volumetric capacities at low peripheral speeds.

Need air in your business?

Want a "work horse" that has proved to be a good investment in hundreds of industries?

Then, put these time-proven, quality-built American Blower Utility Sets to work. They are unsurpassed for general ventilation where duct systems are required.

There's an American Blower product for every air-handling need — for process work, for pressure duties. for ventilating, heating, cooling, air conditioning.

Just call one of our branch offices for data.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

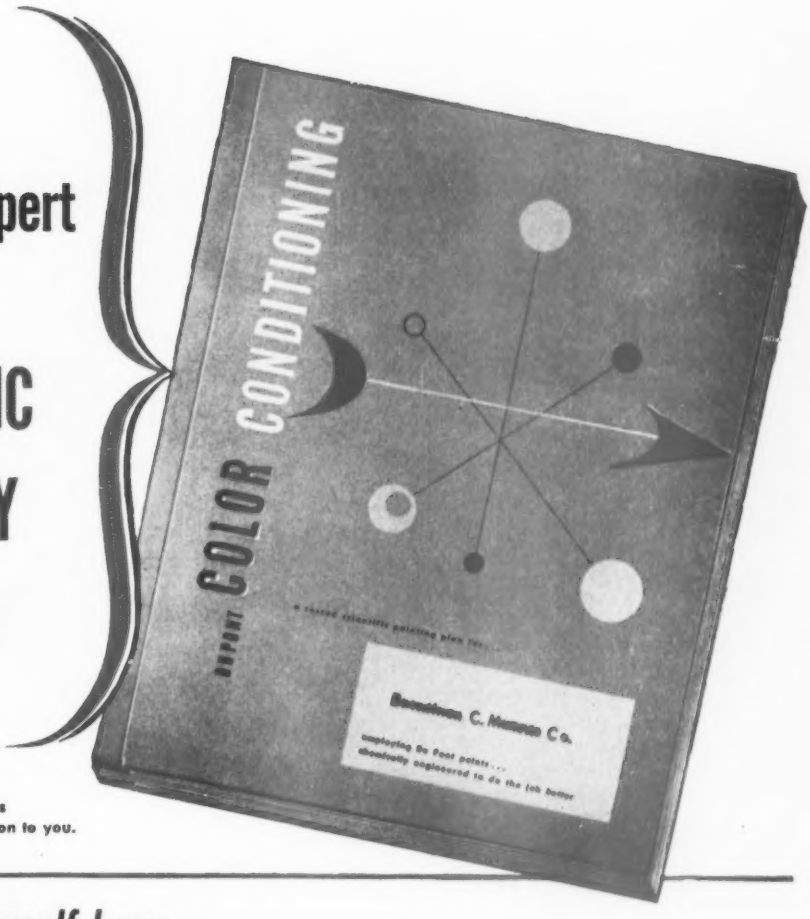
Division of American Radiator & Standard Sanitary corporation

AMERICAN BLOWER

YOUR BEST BUY IN AIR HANDLING EQUIPMENT

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS

Let a Du Pont Paint Expert make this FREE SCIENTIFIC COLOR SURVEY of your plant



Complete, personalized painting recommendations submitted in this portfolio at no cost or obligation to you.

See for yourself how

DU PONT COLOR CONDITIONING

improves efficiency, safety and morale . . . yet costs no more than ordinary maintenance painting

Thousands of industrial plants and commercial and public buildings are saving on painting dollars today by placing all of their problems in the hands of expert Du Pont paint specialists. It will pay *you*, too, to put scientific Du Pont Color Conditioning to work.

Here are some of the dividends that Du Pont Color Conditioning pays: in factories, office buildings, schools and hospitals it provides better seeing and working conditions . . . helps raise the standards of efficiency, safety and morale. In stores, restaurants, hotels and apartments, it makes use of human psychological reaction to color to attract patronage . . . stimulate traffic . . . sell more merchandise.

Let a Du Pont paint expert make a complete analysis of your particular painting needs, make complete color recommendations, help solve the problem of protecting valuable machinery with specialized Du Pont finishes. For further information, mail the coupon below.

DU PONT PAINTS

Chemically Engineered to do the job better

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Finishes Division, Dept. F-253, Wilmington, Del.

I'm interested in Color Conditioning for ( ) industrial plant; ( ) hospital; ( ) hotel or apartment building; ( ) school; ( ) restaurant; ( ) store; ( ) office building. Please send further information and have a Du Pont maintenance-painting expert arrange for an appointment.
(*Offer not good outside continental United States*)

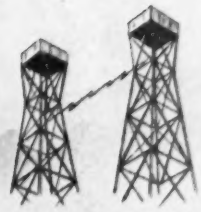
*Name*_____

*Title*_____

*Firm*_____

*Address*_____

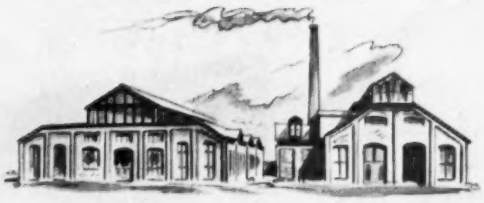
*City and State*_____



1922—First power line carrier current equipment installed.

1944—First application of frequency modulation to power line carrier current equipment.

1947—First microwave relay system in commercial operation.



1875—Elihu Thomson, one of the founders of General Electric, transmitted and received wireless signals for a distance of about a hundred feet.

1915—Sample radio-telephone transmitter installed on two U. S. battleships and used in 1916 Spring Naval Maneuvers.

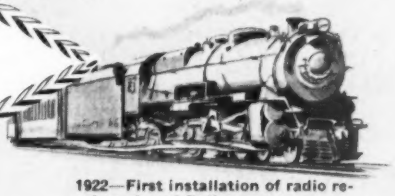
1931—Sonic locator developed for use by ships in fog. It was the first step toward radar.

1937—First application of radio communication aboard fireboats. New York City Fire Dept. installation.

1878 75 1953

YEARS OF ELECTRICAL PROGRESS

1923—First airmail plane radio communication equipment installed and tested.

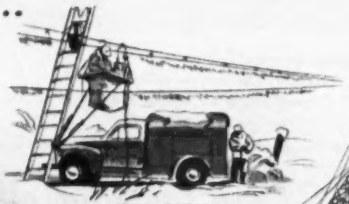


1922—First installation of radio receiver aboard Pullman cars.

1927—First front-to-rear railroad communication equipment installed.

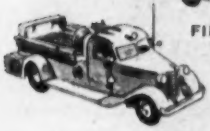
and today...

INDUSTRIAL 2-WAY RADIO

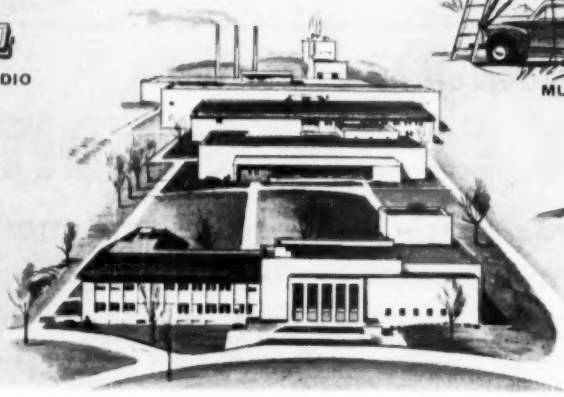


MUNICIPAL

POLICE



FIRE DEPTS.



CONSTRUCTION

Matchless Heritage IN COMMUNICATIONS ENGINEERING

From the several companies formed to manufacture Edison's historic electric lamp, G.E. is today a company with 200,000 products . . . engaged in 13 of the 21 basic manufacturing industries. Its tremendous human and material resources are constantly working to give you a better life with new and improved products.

Communications in your business is the outgrowth of many G-E "firsts." Today — using G.E.'s *high-performance, low maintenance* radio units—industry, utilities, and municipal government reap these benefits: instant reliable communication for increased productivity . . . area control . . . citizen protection.

For information write: *General Electric Company, Section 6523, Electronics Park, Syracuse, New York.*

GENERAL ELECTRIC

HALL INDUSTRIAL WATER REPORT

Hall Laboratories, Inc.—A Subsidiary of Hagan Corporation, Pittsburgh, Pa.

Volume 1 | FEBRUARY 1953 | Number 1

New Water Manual Published by ASTM

Of interest to everyone concerned with industrial water is ASTM's "Manual of Industrial Water," a January 1953 release, prepared by Committee D-19. Manual discusses uses of industrial water, difficulties caused by industrial water, compositions of waters and deposits, treatment, sampling, analysis of water, identification of water-formed deposits.

Research by Hatch Gives New Basic Facts on Threshold Treatment for Corrosion Control

Research papers by Dr. G. B. Hatch of Calgon, Inc., titled "Protective Film Formation with Phosphate Glasses" and "Inhibition of Galvanic Attack of Steel with Phosphate Glasses" provide a better scientific understanding of the mechanism of film formation with Calgon.

Data prove Calgon stops corrosion by virtually eliminating flow of current between anode and cathode in corrosion cells.

Research shows Calgon is a cathodic inhibitor. All cathodic inhibitors are "safe" inhibitors, because they do not increase tendency toward pitting.

Data reveal that protective film is formed by electrodeposition process, and that Threshold Treatment for corrosion is quite different from Threshold Treatment for scale prevention.

Write if you want a free copy of these fundamental papers.

Industrial Water Statistics

According to U. S. Dept. of Commerce statistics, use of industrial water for process has been estimated at 80 billion gal per day during 1950. This is 8 times the quantity required in 1900, although population increase in same 50 years was only 2-fold.

Manufacture of steel, production of electric power require 50 billion gallons of the 80 billion per day. Industrial use of water is estimated to increase 170 per cent from 1950 to 1975, according to Materials Policy Commission.

Pilot Plant Designed for Steel Company Results in Minimum Cost for Waste Disposal

A Pennsylvania steel company had to dispose of wash waters evolved in the manufacture of producer gas.

This wash water contained objectionable quantities of phenol, sulfide, and cyanide.

Preliminary study showed that either chemical treatment, or closing up wash water system could do the job. A Hall Labs staff engineer recommended use of a pilot plant to determine chemical treatment costs. He specified equipment for pilot unit, and provided detailed instructions for operation. Pilot plant showed that all hydrogen sulfide and cyanide and about 90% of phenol could be removed.

But cost analysis of chemical treatment revealed it was 2 or 3 times as costly as closing up system. On this basis, decision was to install a recirculating system for the producer gas wash water.

Major problem in closed system was build-up of suspended solids. Methods of controlling this were studied by the Hall staff, and recommendations made to steel company.

State antipollution requirements were satisfied, and another step taken toward clean natural streams with the minimum cost to industry.

Field Reports on Industrial Water Treatment

Herman Reda, Service Engineer in our Detroit Office, made the following report on a food processing plant in his area:

"Turbines have now operated continuously for 3½ years. Prior to use of Hall System, plant had to clean units every 6 months."

A report on boiler water control comes from Bill Pfeiffer of the St. Louis Office. Report concerns a paper company:

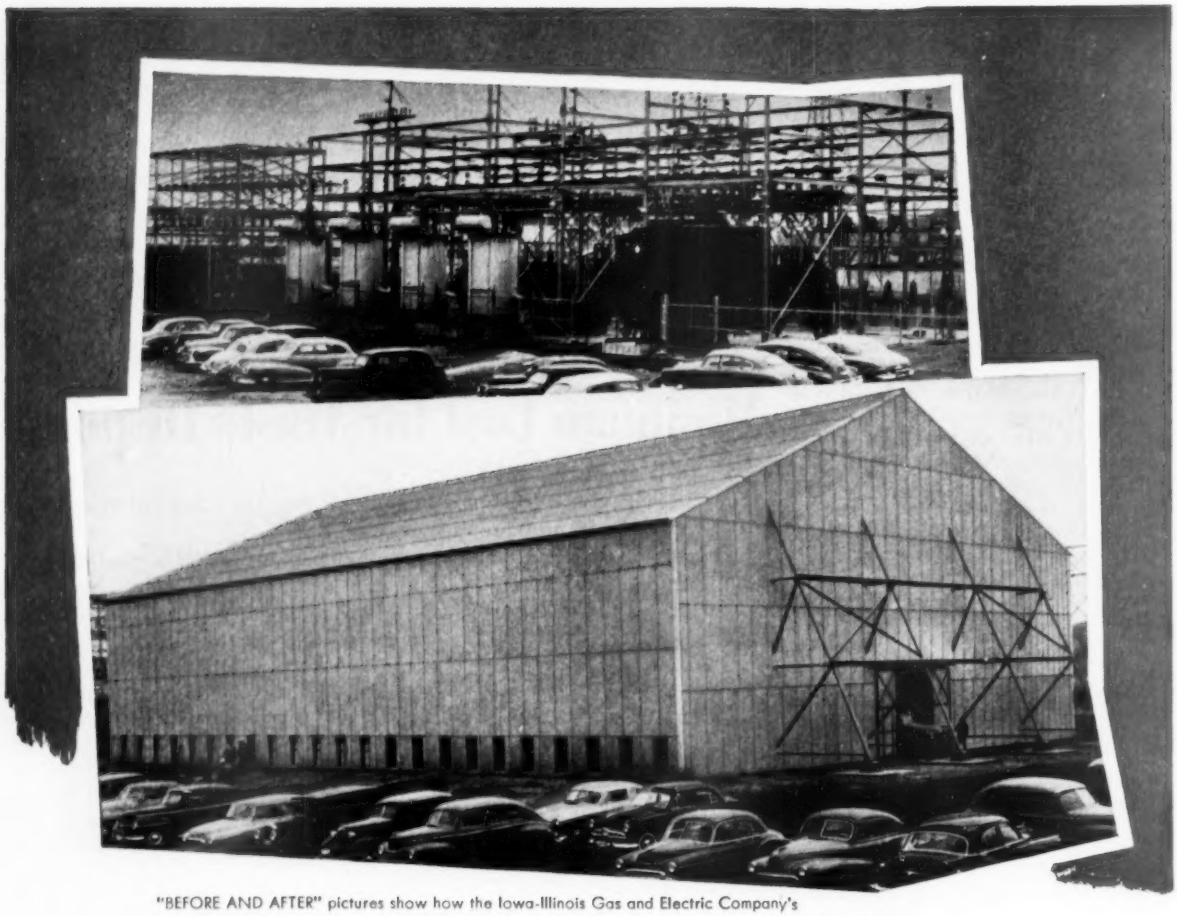
"Client is pleased with silica treatment. After silica had been fed for about 3 months, boilers were opened for inspection, found to be much cleaner than client ever saw before. Heavy sludge usually found in top rear drum and mud drum was almost gone. Silica is also helping out at the filters, and filtered water contains no suspended matter. Client cleaned filters with Buromin—pleased with results."

"Calgon" and "Buromin" are names of phosphate glasses developed by Hall Laboratories for industrial water treatment and marketed, respectively, by its associates, Calgon, Inc., and the Buromin Company who have registered the names in the U.S. Patent Office as trademarks. "Hall System" is similarly registered as a service mark by Hall Laboratories.

Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information, write, wire or call Hall Laboratories, Inc., P.O. Box 1346, Pittsburgh 30, Pennsylvania.

Water is your industry's most important raw material. Don't waste it.



"BEFORE AND AFTER" pictures show how the Iowa-Illinois Gas and Electric Company's sub-station at Bettendorf, Iowa, was protected by an "umbrella type" cover of "Century" Asbestos-Cement Corrugated. **Erection Contractor:** Illinois Roofing and Insulation Company, Chicago, Illinois.

For a special problem —such as an "umbrella" for a sub-station— or for 1,000-and-1 typical industrial applications,

"CENTURY"

asbestos-cement corrugated roofing and siding is the satisfying, economical solution

"Century" Asbestos-Cement Corrugated solved an unusual problem at Bettendorf, Iowa. The 69,000-volt sub-station there of Iowa-Illinois Gas and Electric Company had an hour's service breakdown in early 1950. It was found that a sulphurous acid mixture of smoke and fog, swept in from a nearby generating station by the wind when in a certain quarter, had collected on the insulators and caused flash-overs or shorts. It was decided that the entire sub-station should be put under cover (which rarely, if ever, is done) as protection against this condition, and a steel framework covered with "Century" Roofing and Siding was erected. This "umbrella" has kept the insulators clear, and service uninterrupted.

In this, as in countless less unusual cases, experience has shown that "Century" Asbestos-Cement Corrugated is an ideal covering. It is composed of asbestos fiber and portland cement, subjected to pressure to form a dense product, strong and durable. "Century" Asbestos-Cement Corrugated *can't burn*, is highly resistant to weather, rot, rust, and corrosive fumes, is proof against rats, termites, and other destructive insects.

The moderate cost of "Century" Asbestos Corrugated, erection and low maintenance expense, all contribute to an economical installation. Additional and substantial savings can also be effected by using TOP-SIDE* Fasteners over any steel framework, which eliminates scaffolding. Once up it stays and needs no protective painting. Consider the savings in labor alone.

Write us for further details . . . and name of your nearest distributor.

*® H & B Enterprise Corporation

Nature made Asbestos . . .
Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

K&M best in asbestos

Condor V-Belts–More use per dollar

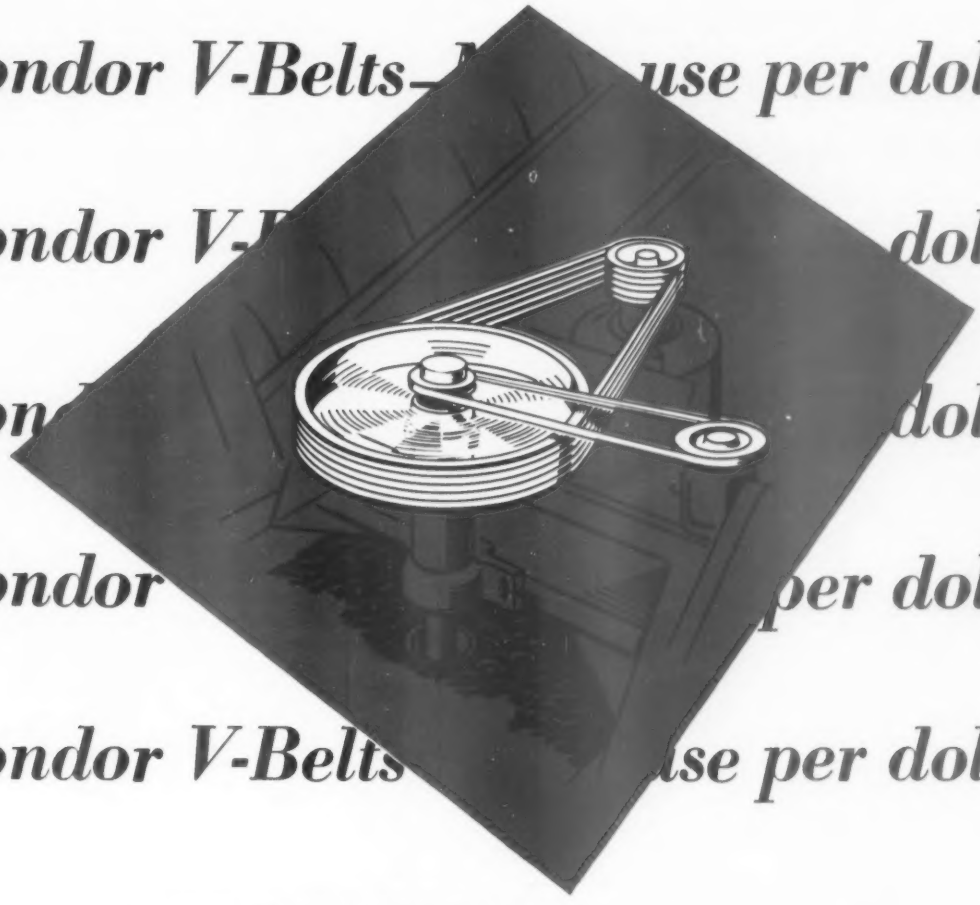
Condor V-Belts–M use per dollar

Condor V-B dollar

Con dollar

Condor per dollar

Condor V-Belts se per dollar



LOWER V-BELT DRIVE COSTS . . . for several reasons . . . Straight sidewalls provide more grip, less slip, longer life. Every Condor V-Belt is destretched during manufacture, and the pulling section is micro-positioned where good engineering says it should be. This gives you a smooth running drive, saves downtime for belt take-ups. You get longer V-belt life . . . MORE USE PER DOLLAR. Also in special oil-, heat-, and static-resisting types . . . Get the engineering facts. Ask the R/M distributor for Bulletin 6868 . . . He'll tell you, too, how you get MORE USE PER DOLLAR with R/M hose, transmission and conveyor belts.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

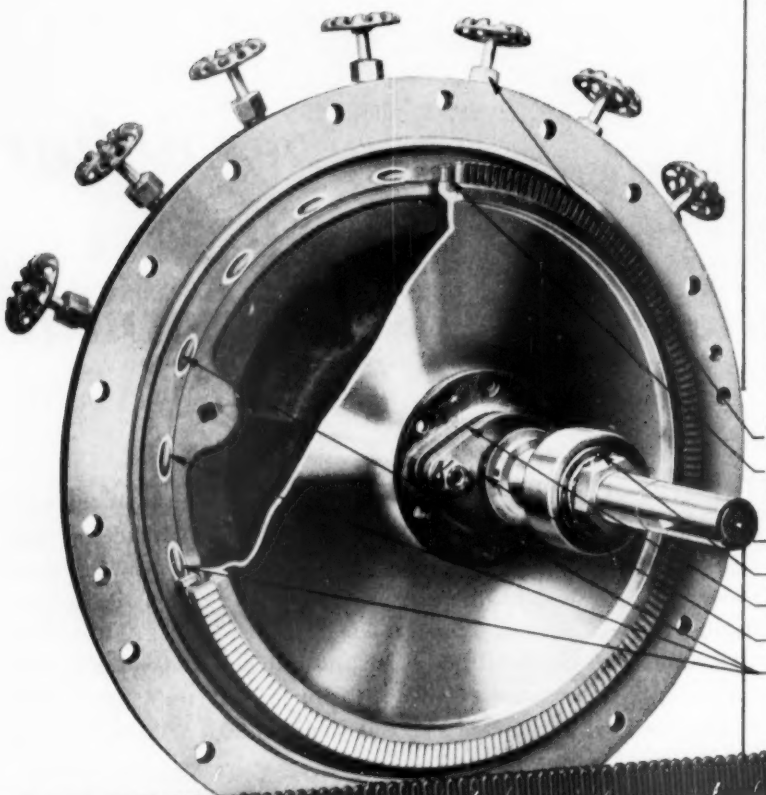
RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Teflon Products • Packings • Sintered Metal Parts • Bowling Balls

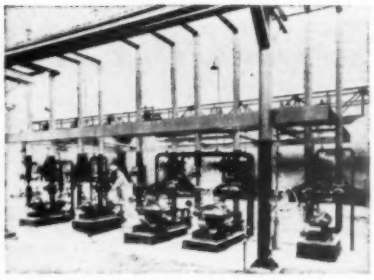
No other steam turbine offers you

SUCH VERSATILE STEAM NOZZLE CONTROL

The larger number of hand valves you see on a Coppus Steam Turbine promises you greater operating economy. At least 60% of the steam nozzles can be individually controlled to give maximum steam pressure in steam chest . . . a guarantee of best water rates at any load. Maintenance economy, too, is assured by the hard chromium plating of the shaft at the stuffing box. It provides the best possible smooth, non-corrosive surface for packing rings.



- 7 hand valves for efficient partial load operation, (20" turbine shown)
- 2 row velocity-stage turbine wheel with stainless steel turbine buckets — statically and dynamically balanced
- 30-40 carbon steel shaft
- Oversized double row deep grooved ball bearing
- Stuffing box with metallic packing ring
- Heavy chrome plating of shaft through stuffing box
- 3 nozzles always open



Coppus Steam Turbines, Type TF, driving chemical transfer pumps at Celanese Corporation of America's Chemcel Plant

Coppus Steam Turbines ranging from 150 hp down to fractional in 6 frame sizes

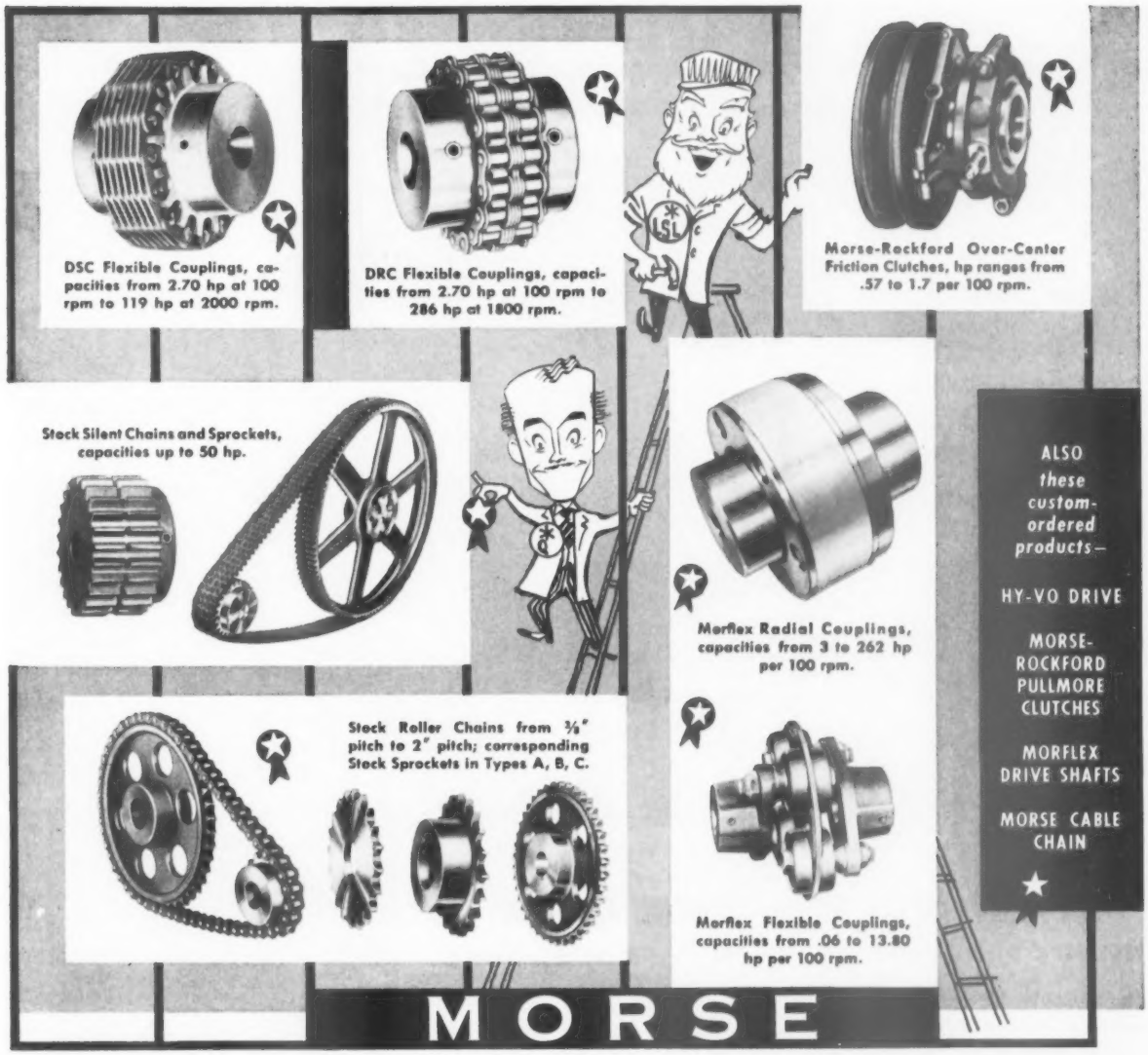
MAKE TURBINE DOLLARS GO FARTHER

Why waste money buying turbines with higher horsepower ratings than you need? The higher the horsepower rating, the higher the price. Save money by selecting the Coppus Turbine size closest to your requirements from 150 hp down to fractional. And when you do, you save operating and maintenance costs, too. That's what these other Coppus features are designed to do: exclusive pilot operated excess speed safety trip supplementing constant speed governor; choice of metallic or carbon ring packing assemblies. Designs available for back pressures up to 75 pounds; replaceable cartridge type bearing housings. For full details . . .

WRITE FOR BULLETIN 135

COPPUS ENGINEERING CORP., 102 Park Avenue, Worcester 2, Mass. Sales offices in THOMAS' REGISTER.

COPPUS "BLUE RIBBON" TURBINES


DSC Flexible Couplings, capacities from 2.70 hp at 100 rpm to 119 hp at 2000 rpm.
DRC Flexible Couplings, capacities from 2.70 hp at 100 rpm to 286 hp at 1800 rpm.
Morse-Rockford Over-Center Friction Clutches, hp ranges from .57 to 1.7 per 100 rpm.
Stock Silent Chains and Sprockets, capacities up to 50 hp.
Morflex Radial Couplings, capacities from 3 to 262 hp per 100 rpm.
ALSO these custom-ordered products—
HY-VO DRIVE
MORSE-ROCKFORD PULLMORE CLUTCHES
MORFLEX DRIVE SHAFTS
MORSE CABLE CHAIN
Stock Roller Chains from ⅜" pitch to 2" pitch; corresponding Stock Sprockets in Types A, B, C.
Morflex Flexible Couplings, capacities from .06 to 13.80 hp per 100 rpm.
MORSE

Top engineering help goes right along with these MORSE Power Transmission Products

You'll go a long way toward getting more dependable, longer-lived power transmission when you specify *Morse*.

But perhaps you need more than just fine power transmission equipment. Perhaps you need specialized engineering help to unravel a particular problem.

Then talk things over with your Morse Distributor. He can give you plenty of help. And when there's need, he can call in a skilled, experienced Morse sales engineer. With the three of you pooling your specialized knowledge, it won't be long before you have things running as smoothly as a Morse Silent Chain.

Take advantage of the cost savings and long service life inherent in the readily available Morse equipment (above). Check with your local Morse Distributor today.

*Engineering Service, Long Service Life, Quality—which you get in unusual degree when you buy Morse Power Transmission Products

MORSE
MECHANICAL POWER TRANSMISSION PRODUCTS
BW BORG-WARNER

MORSE CHAIN COMPANY

Dept. 574 • 7601 Central Avenue • Detroit 10, Michigan

Circulating conditioned air evenly throughout the smokehouse is a problem.

HOW TO "SMOKE OUT"

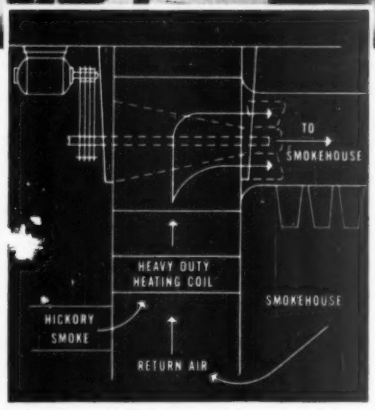
HIGH OPERATING COSTS IN A SMOKEHOUSE

The circulation of conditioned air, so necessary for smoking meats, has always been a problem. Tars accumulating on the fans and heating coils cut capacity, thus slowing down production. The necessary maintenance further increases operating costs, but not any more.

Armour and Company knew they needed a fan that would keep belts and bearings outside of the air stream. The housing had to be so shaped that it would not collect tars. The steam heating coil had to be sturdy, easily cleanable, and efficient.

Engineers of Armour and Westinghouse teamed up—decided on Westinghouse Elbow Axiflo® Fans and Heavy Duty Steam Coils built entirely of steel. This was the answer to this involved problem. The fans and coils fill the bill so well that they have now been put into service at 16 Armour smokehouses.

Some day you may have a problem that involves *putting air to work*. When you do, remember that Westinghouse has the most complete line of air handling, air cleaning and air conditioning in the industry. Ask for new Catalog 600. It contains 60 fact-filled pages on these products, and how they can put air to work for you. For your free copy, call your local Westinghouse-Sturtevant office. Or, write to Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.



HOW A SMOKEHOUSE IS "SMOKED"

Hardwood smoke is drawn into the system and mixed with return air from the smokehouse. This mixture next passes over a heating coil to bring it to the proper temperature. An Elbow Axiflo Fan then turns it 90° into ducts which feed the discharge nozzles.

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LOOKING AHEAD IN LABOR

Last-minute round-up as we go to press

Taft is still the key man on Taft-Hartley. He will decide how it will be amended in this session of Congress. Make no mistake on that.

True, Sen. Smith of New Jersey is new chairman of the Senate Labor Committee. But he is a Taft man of long standing on labor issues, will listen to the Ohio Senator. Rep. McConnell of Pennsylvania, new House committee head, is Taft-minded, too.

Hearings will begin this month. They will drag, almost endlessly. Everybody will be heard. So don't look for a new Smith-McConnell Act until early summer, maybe June.

Taft-Hartley amendments will be mostly technical, balancing improvements. Highly controversial issues will be avoided if possible. Like industry's wish for a curb on labor monopolies and industry-wide bargaining. Or labor's demand for the closed shop.

•

Three changes directly affecting employers have a good chance of passing:

- Requiring employers to sign non-communist affidavits (as union officials now do) if they want to seek elections or file unfair labor practice charges.
- Giving "economic" strikers who have been replaced the right to vote in a bargaining poll.
- Perfecting the secondary boycott ban so as to cover union pressure on a secondary employer as well as on his employees.

Basic principles of Taft-Hartley will stay. These include injunctions obtainable by the government, protection of individual rights, prevention of unfair labor practices by unions, and machinery for coping with national emergency disputes.

Taft doesn't plan to tinker with the national emergency section; thinks the 80-day injunction should get a fair trial under a friendly administration. But events may dictate otherwise.

Basic steel wage negotiations come to a head in June, under a July 1 wage re-opener in the two-year contract with CIO. Threat of another steel strike may impel Congress to alter the national emergency procedure. In 1949 Taft went along with seizure as an alternative to the injunction. This was a compromise, however. He is against it now. So is most of Congress.

Other labor legislation doesn't have much chance in this session. Wage-hour and public contracts acts seem set for another year. FEPC will get some support, but won't get beyond a Senate Labor Committee recommendation, if that far.

Smith voted with Ives in reporting a compulsory FEPC bill out of committee last summer. But Taft will hold out for a voluntary measure. So will McConnell and his House committee. If a bill should by chance get through Congress, it will not carry compulsory enforcement powers.

•

Preliminary eighth-round bargaining tests already are under way in automobiles, rubber, textiles, electrical manufacturing, and meat packing. But these are little more than "feelers" involving short-term wage re-openers, conversion to the new cost-of-living index, or—as in textiles—a depressed industry. The unions won't press too hard.

First real showdown should come in basic steel in June, followed by copper mining in August, and coal and railroads in September.

Prospect right now is that another round of wage increases is in the cards. Around 10 cents or less, assuming business stays good. David McDonald, new head of CIO's steel union, feels he must win a sizable wage increase to establish himself as a worthy successor to Philip Murray.

•

That's why Walter Reuther wants so badly to adjust his five-year escalator in the automobile industry. It brought auto workers only 8 cents last year, compared to 10 cents or more for most other workers. Prospect for 1953 is that living costs will rise even less. Reuther feels rank-and-file pressure.

Lurking in the minds of labor negotiators is fear that this will be their last chance to deliver a big wage increase in the 10-to-20-cent range that has become typical since the war. Union economists look for a business recession next year. This would push living costs down, force wage cuts in automobiles unless Reuther got his higher floor in the escalator.

SEE PRACTICAL LABOR RELATIONS, PAGE 218

LOOKING AHEAD IN BUSINESS

Last-minute round-up as we go to press

Industrial production is off to a roaring start in 1953. Steel output in January is higher than October, the peak month of 1952. Production of automobiles and trucks at mid-January was also running higher than the top month of 1952. Construction awards leaped far ahead of previous months. There is ample reason to believe that the entire list of durable goods manufacturers is following suit.

The effect of this high rate of production on employment is to keep 63-million people at work. There are now only 1.3-million unemployed, the lowest level since 1944.

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The Federal Reserve Board's index of industrial production keeps inching up. It now stands at 234, compared with 220 for most of last year. The McGraw-Hill Department of Economics estimates that this is very near to 90% of capacity as an average for all industry.

The United States is again in the position of making full use of its manpower and factory resources. The full use of resources is a happy state of affairs for everyone. It means high factory output, good profits, high personal incomes, and rising living standards.

The only troublesome thing about this happy condition we find ourselves in is that the United States has seldom gone for long periods with its economy strung as tight as it is right now. When American industry gets keyed up to such a peak use of its capacity and labor, we can usually count on a swing into some degree of inflation or deflation.

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A taut industrial economy making full use of its resources will begin to spiral into inflation, if buying keeps up, and if we get either an increase in bank borrowing or new wage increases. During 1952, businessmen and consumers both borrowed money from banks at a rate 6% higher than the increase in the volume of business. In other words, bank credit outpaced the growth in business. During early 1953 there will be many new wage contracts coming up for negotiation. We could get more than the usual crop of wage increases. Another fact of interest is that industrial prices have been firming up. They seem to have hit a bottom about four months ago, after more than a year of decline. A few price increases have recently been announced.

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Are these signs that we're in for another siege of inflation? Probably not, but it's hard to say. The potential for inflation is certainly there. A new international crisis would certainly have very immediate and sharp effects on prices. Even without an international crisis, a continuation of the present rate of borrowing by business and consumers from banks could lead to further inflation.

There are also some forces at work that could make for deflation. One soon to be felt is the tax collection period in March. The Mills plan speed-up of corporate taxes, together with individual tax returns, will make a heavy drain on cash to meet payments. Moreover, an unexpected thing is going to happen.

The government is going to run a surplus this fiscal year, instead of the expected deficit. There are two reasons for the surplus. One is the recent sharp climb in personal income. The other is the repeated stretch-outs of military production. A government budget surplus is deflationary. It takes more money out of the flow of income in the business community than is put back in.

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Another possible source of deflation is the tremendous productive capacity of most industries. The great expansion in plant and equipment during the past two years may have created more production capacity in some lines than can be sold. The automobile companies are now producing at a rate of nearly 7-million cars a year, even though the most optimistic of them do not expect to sell more than 5½-million. At least two of the older electrical manufacturers have stepped up appliance output to try to recover their former share of the market. In short, the competitive race may be driving factories to produce more than can be sold.

Which of these forces will prevail—inflation or deflation—is not yet clear. Probably the momentum of factory production will keep business high until mid-year. After that, it's anyone's guess. But, as of right now, some deflation appears a little more likely.

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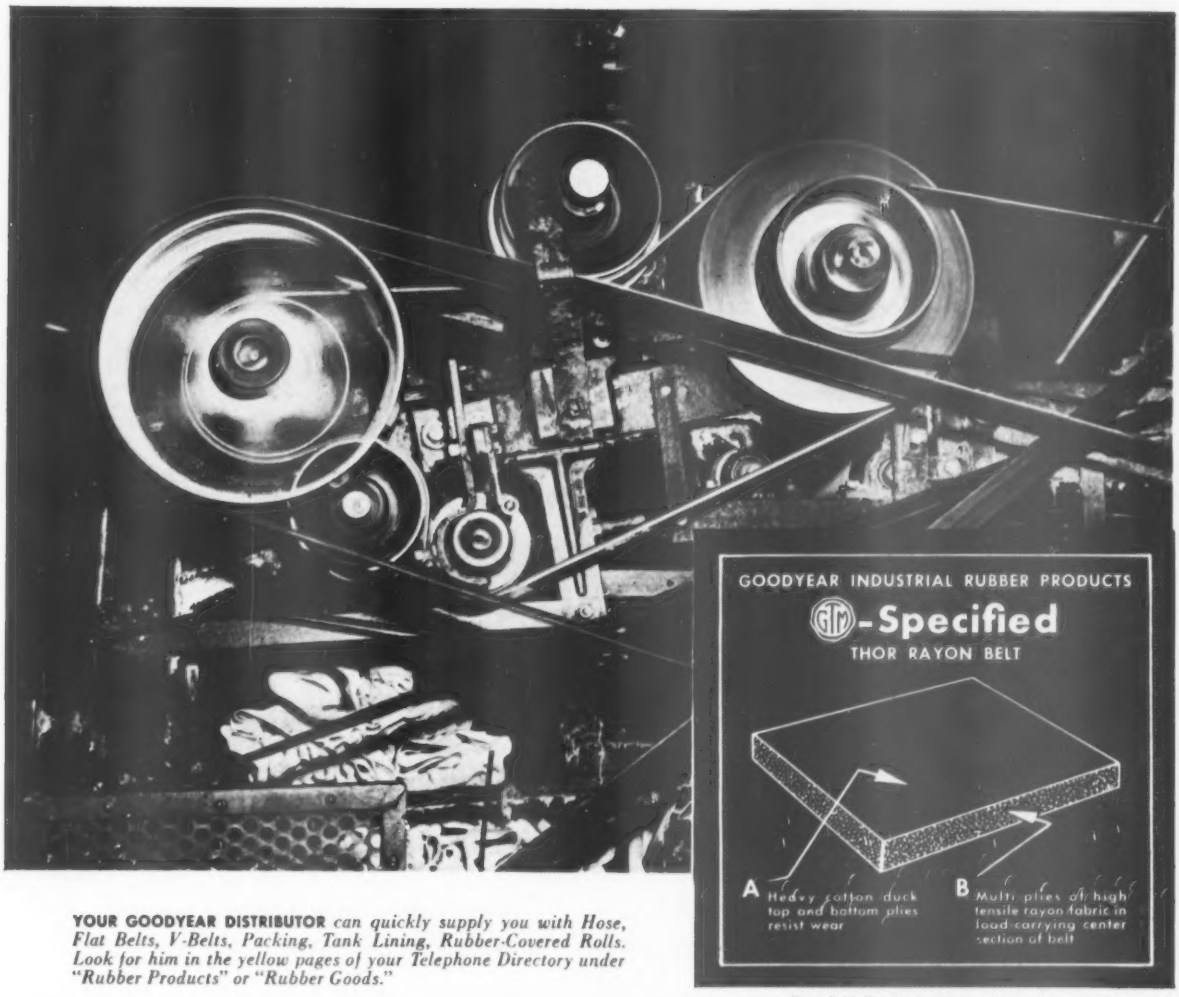
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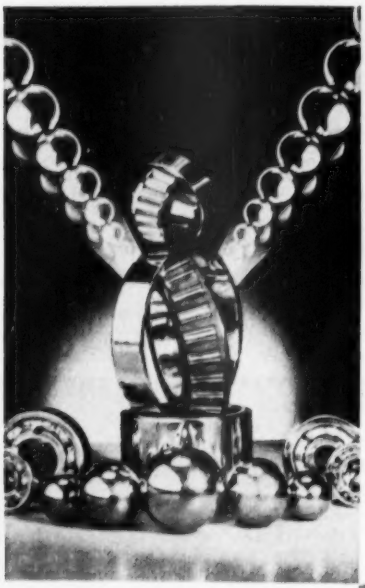

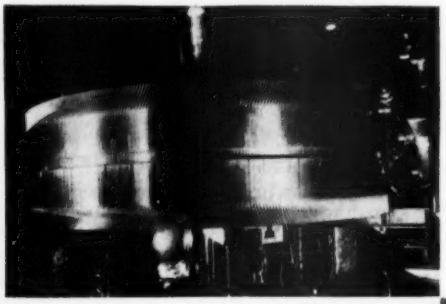

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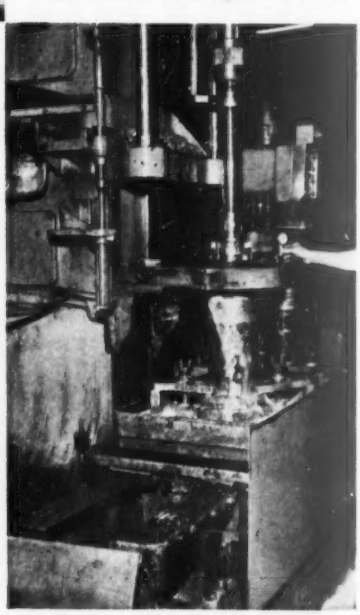

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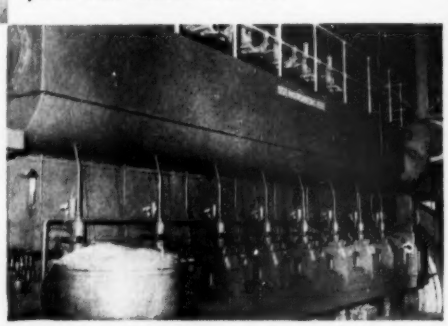

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FACTORY MANAGEMENT AND MAINTENANCE

HARRY LEE WADDELL, EDITOR

NEEDED: Hyphenated Engineers

WHAT DOES THIS MEAN? It means engineers—by formal academic education, or practical training, or both—who are not limited to the traditional fields of engineering specialization.

The whole trend of industrial progress demands engineers who can think and work across the lines that have separated and channelized the specialists. This is not just for the "Buck Rogers" factories. The need is a reality in *every* progressive plant.

It is not brand-new. But the present-day era of rapid technological progress is making the need more apparent—and more urgent.

The man who takes full advantage of today's opportunities to devise better production equipment—better methods—more economical maintenance—needs to be more than a mechanical engineer, an electrical engineer, an electronic expert, or a chemical engineer. Without a working knowledge of several of these fields, he can't take advantage of the full opportunities of manufacturing engineering today—let alone tomorrow.

The Individual's Responsibility

The ambitious men already in industry are recognizing this need—and doing something about it. They are trying to acquire a knowledge of fields outside their own original specialty. For they realize that their ultimate progress depends on this broader knowledge.

They are "getting next to" smart engineers and experts in other fields in their own companies. They are reading extensively in technologies outside their own. Some are taking extension courses in universities, where possible.

They are not limiting themselves to traditional engineering fields, either. They are learning the rudiments of statistics, and accounting, and professional management, and even nuclear physics. Not enough are, but as we editors of FACTORY get around, we see quite a few.

The Colleges' Responsibility

A few engineering and business schools are recognizing this need for graduate and even undergraduate students. They have a long way to go, but there are encouraging signs that they are on the way.

For instance, at a recent American Management Association conference, John E. Arnold, associate professor of mechanical engineering at Massachusetts Institute of Technology, said:

"The technical schools are much concerned with the extreme demands placed upon them by industry for graduates. These demands come about, of course, through technological improvement in industry, automation being one of those technological improvements. It is hard to say whether industry will need more mechanical, civil, electrical, or chemical engineers. Each seems to have a definite and specific role to fill.

"For one thing, however, we are going to need combinations of these various types of engineers. We are going to need electro-mechanical engineers and electro-chemical engineers. Therefore, we are urging young men to take up a multiplicity of specialties rather than concentrate on a single field."

The Company's Responsibility

But the real job is the employer's. His company has the great stake in broadening the horizon and knowledge of the engineers and manufacturing specialists who are now at work.

One company has set up a program of job shifts to put engineers of one speciality in close cooperation with engineers in other fields. Another has started a training program that can carry its engineers from field to field as long as their interest in self-improvement persists.

These companies realize that they can progress only so far as their people progress. That their own horizon is limited only by the extent to which their engineers can use practical imagination in the total process of design, manufacturing engineering instrumentation and control, maintenance, quality control, and so on, and so on.

Harry Lee Waddell

If you're "too busy," here's how . . .

You Can Use

THERE'S AN OLD STORY about a farmer who told his wife he would plow the south 40 tomorrow.

It goes like this: The next morning he went out to lubricate the tractor. He found he needed some more oil, so he went to the shop to get it. On the way, he noticed the pigs weren't fed. He went to the corn crib to get them some corn, where he saw some sacks by the crib. That reminded him that the potatoes needed sprouting. He started for the potato pit to sprout the potatoes. But, as he passed the woodpile, he remembered he wanted to take some wood to the house. He had picked up a few sticks when an ailing chicken passed by. He dropped the wood and reached for the chicken. He . . .

But that's enough of the story. It's important only if it means something to you.

Does it, for example, bear any resemblance to your own methods of operation on the job?

Do you, perhaps, start out for the shop, run back to make out a work order, stop on the way to talk to a foreman or worker, leave him to answer the phone, have the caller call back because a telegram requiring an answer caught your eye as you picked up the phone?

These may seem to be exaggerations of the

How to Analyze

Now to the big questions: When is a job saturated with low-level work? Is there any pattern or "scale" for measuring an executive's work in terms of high or low level? How can I evaluate my own day's work?

Fortunately, these questions are answerable in a practical way—not in the form of a rigid "one

Being too busy on the job is no joke. It can—often does—mean the job's on top of *you*, instead of the other way around. And it often means frustration and poor performance as well, if you're too busy doing the wrong things.

You won't find any miracles here. Nobody can remake you, but you *can* remodel your own work habits substantially with a little outside help and stimulation. That's the reason for this article. It offers you simple ideas and techniques that should help you get more results for your time—and more time for results.

Your Time Better

By W. E. DEWEY*

problem of making good use of your time. But they point up this basic time-utilization principle:

The more systematic you are, the more effective you will be in your use of time.

Unless there is conscious, planned effort to avoid it, every executive will find himself doing a certain amount of meaningless hopping from one job to another. Often what he begins to do in the morning, what he does at 10, or 2, or 4 o'clock are to a surprising degree a series of coincidences.

This happens on a weekly and monthly basis, too—not just daily. In some cases, you can almost conclude that any resemblance to what some executives do and a systematic schedule is completely coincidental!

This is not merely a personal matter, and cannot be dismissed as unimportant, even if you are convinced there is no way to improve your *own* use of your own time. What about your subordinates?

It is a major and costly problem of human engineering to get *all levels* of executive, technical, and staff personnel to work and produce on the level for which they are paid. The day's work insidiously tends to become saturated with work that other people should be doing—and are already being paid to do.

There's a good parallel between railroading and management in this respect. "Good railroading" means using 6000-hp. engines to roll big trains across country, and 500-hp. engines to switch cars around the yard.

Similarly, "good management" means using executives for rolling management problems across country. These men are not paid to do the little car-switching jobs.

In terms of cost alone, it's simply too expensive for railroads or managements to use the wrong engine for the wrong job. It is sheer bad management when a $5-an-hour man does $1.50-an-hour work. You don't like it when a $1.50-shop mechanic does $1-helper work. Why should not the same dislike attach to your own activities and those of your immediate subordinates?

Aside from cost, there's an even more important factor to consider—*results.*

If you and your key people are spending your time on little matters that others are being paid to do, what happens to the big problems when they come along?

To go back to railroading for a moment: If your big engines are used to scoot cars, they're not available to roll the big trains.

Your Work

best method," but clearly enough to help anyone who is really interested.

Simply setting a schedule is not enough to solve the time problem. There's more to it than that. The *kind* or *level* of work must be considered as well as the amount of time you'll have to spend. Failure to do so is one of the most common reasons for failure to make good use of available time. Now let's take a look at the four different kinds and levels of work you do.

Turn the page

* Author of "Dynamic Management," to be published later this year by McGraw-Hill Book Company. This article is adapted from a chapter in this new book.

Begins on page 84

Time-Utilization Scale

In the chart at the right you will find the basis for a time-utilization scale that you can use as a guide. It is a practical scale, based on experimenting with different time distributions.

What the scale means. Broadly speaking, the time-utilization scale means four things:

1. Delegate *routine* to a subordinate or a method.
2. Do your *regular work* efficiently, in about two-thirds of your time.
3. Accept *special assignments* willingly, and accomplish them with dispatch.
4. Look for and do *creative work* on the job.

Now, taking these just as given, they add up to some pretty sound advice. But they don't really give you much to go on in planning work in detail. You need more information on what is meant by the terms *routine, regular, special,* and *creative.*

Let's take a look at a few examples in the work of John Smith. John is a $4-an-hour man—in the $8000-a-year class, in other words. Half-a-dozen supervisors report to him; he has a secretary.

Routine work. Largely routine jobs could easily take up 30% to 40% of John's time if he let them. When John answers the phone (in most cases), when he dictates most letters (not all; some are creative), when he marks things to be filed, checks over figures in a report he's written, or checks a pile of time tickets, he's doing routine work. There's lots of such work—things to look at, to file, to talk about, to tell somebody else about.

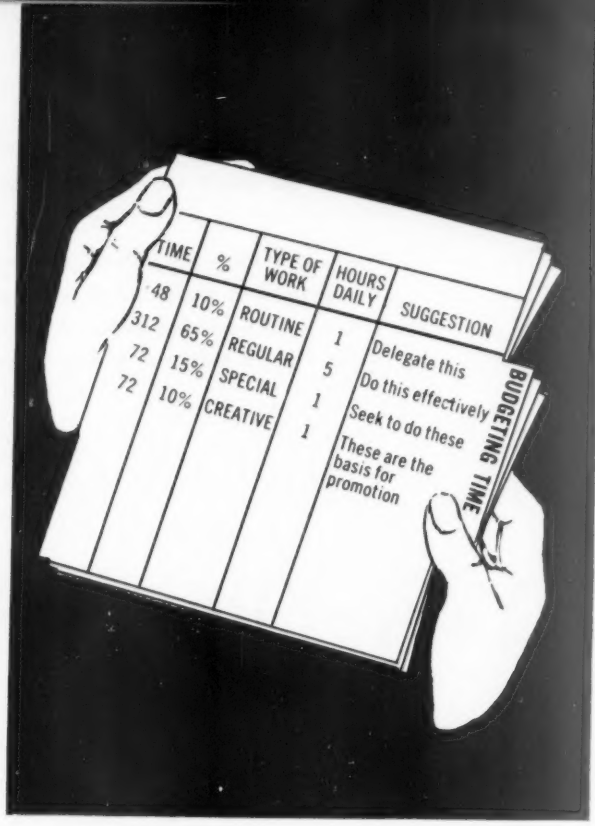
John can't just duck all this routine. He shouldn't. But he can use three powerful allies to help him keep the routine from wasting time—his secretary, his operating subordinates, and his systems and procedures (designed to handle commonly recurring situations).

Regular work. Regular work varies by plant, by man, and by job. But it's easy enough to define in the individual case: It is the basic executive, administrative, and supervisory tasks that the company has put a price (in John's case) of $8000 a year on.

John must spend time directly supervising and conferring with his subordinates. He must work out ways and means with them (and with his own superior) to meet performance schedules, and to meet or exceed standards of quality and accuracy. He must plan and organize activities. He must control them and report upon progress and problems to others.

In doing these things there are innumerable small questions and problems that arise. Some can be routinized, but most cannot. These all fall in the class of *regular job duties.* They're big and important, take much more of John's time than anything else.

Special work. Special jobs come to John in two ways: If John is on the ball, a great many of them come from *him.* In other words, they're projects



BASIS FOR TIME BUDGET is provided by this breakdown of time you should give to the four main kinds of work you must do.

he has ordered *himself* to do. He feels his organization chart could stand revision. Part of the department needs a change in layout. He can see where a change in a form might save some money, but he has to think it through pretty thoroughly.

But that's not all. Another source of special jobs is higher management. The executive vice president wants someone to sit in for him on a committee meeting downtown and give him a full report. He calls on John, perhaps because he knows John always seems on top of his job.

Creative work. Now we come to one of the most vital aspects of John's work. Here's where he has the chance to come up with *new* things—ideas, practices, recommendations that go beyond the normal requirements of his regular job. Notice that this is more than just doing a special job that needs doing.

Revising the layout of a section of the department is in the special-job class. But coming up with a brand-new layout idea for the whole operation is genuinely *creative.*

Job instruction of an immediate subordinate is part of John's regular job. But devising a conference training program that helps his staff lick some tough operating problems is *creative.*

Seeing that job descriptions are periodically reviewed is a special project. But analyzing work requirements and finding a need for only one $4000-a-year job and two $2500 ones—instead of three at $4000—is *creative work* ($3000 worth).

ROUTINE	ROUTINE	ROUTINE	ROUTINE	ROUTINE
Inspection and supervision of operations REGULAR	Individual work with staff REGULAR	Inspection and supervision of operations REGULAR	Individual work with staff REGULAR	SPECIAL WORK
	Inspection and supervision of operations REGULAR	Division staff meeting REGULAR	Control studies and reports REGULAR	Inspection and supervision of operations REGULAR
				Our staff meeting REGULAR
L	U	N	C	H
Interviews and contacts REGULAR	Interviews and contacts REGULAR	Interviews and contacts REGULAR	Interviews and contacts REGULAR	CREATIVE WORK
Planning and organizing REGULAR	Inspection and supervision of operations REGULAR	SPECIAL WORK	Inspection and supervision of operations REGULAR	
ROUTINE	ROUTINE	ROUTINE	ROUTINE	ROUTINE

PATTERN FOR TIME BUDGET like this helps you to visualize ways of organizing your work on a weekly basis. Such patterns must be tailor-made to fit your own needs. They must also be supplemented by specific daily lists of things to do.

How to Make a Time Budget

A time-utilization scale means little if it isn't translated into action. To do this, it's necessary to build a *time budget* based on the scale, and then to work out safeguards against job-hopping.

Your budget must be flexible. You can't put yourself—or your subordinates—in a strait jacket. Many of the satisfactions of work could be destroyed by so doing, as would the benefits of the budget itself. These facts argue for a *weekly* budget as the basis for time planning.

The chart above shows a generalized sample of such a budget. Note that this is just a sample, constructed to show the technique. Actual placement of routine work would depend on your own operating situation. Because it works well in many cases to put it at the beginning and end of the day, doesn't necessarily mean that's best for you.

It's also quite obvious that creative work isn't going to be confined to the specific part of the week allotted to it on budget. Creative work often takes place in staff meetings and in individual conferences. But the advantage of a given period of time devoted to it is nevertheless considerable. That's the time when you *concentrate* on this aspect of your work.

Now, how about sitting down and making up a first draft of a time budget of your own? It doesn't have to be fancy. Just make it as realistic as you can, in view of all your own local problems and complications. Don't try to be too detailed. Keep the budget general, for flexibility. If you want to get down every minute detail, leave that up to your *daily* work schedule.

Are you confused as to how to classify certain activities? Here are a few to practice on: improving a method . . . dictating a letter . . . preparing an outline for a staff conference . . . personal chat with a subordinate . . . signing letters . . . ordering supplies . . . handling a grievance . . . training a new supervisor . . . helping a subordinate construct a time budget . . . observing the installation of a new piece of equipment.

Who should make your time budget? There's just one good answer to this question: *You* should do it.

You could get a staff assistant to do all or part of it, theoretically. But it wouldn't work. You could make up budgets for your subordinates, and order them followed. That wouldn't work either.

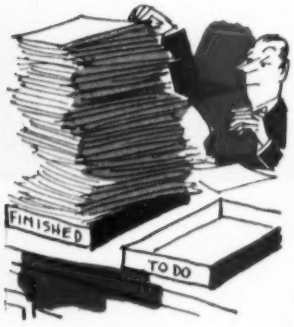
That's the morale-destroying way. It's a forced standard, imposed from without. What's needed here is a self-imposed standard—developed because the person himself realizes the need and has work out his own solution.

Turn the page

10 Hints on Scheduling Your Time

No one can tell you how to schedule your own time in detail. That's something only *you* can do. But there are many simple ideas and techniques that anyone can use to help get the most out of every day's work. A few are discussed below. They're not new, but they may remind you of some things you can start doing at once that will help clean up some of your own time bottlenecks.

1. INCREASE YOUR READING-AND-WRITING SKILL. This is basic. The aim is to do more reading and writing, of better quality, in less time. Fortunately, it's quite practical to achieve these results. And, unless you're already very good, you can do a great deal right on your own—without having to seek outside assistance. (See FACTORY, October 1951, page 84: "How to Read Faster and Better"; and June 1952, page 132: "How to Improve Your Writing.")



2. MAKE GOOD NOTES—AND KEEP THEM. The executive who meets dozens of people a day and attends frequent meetings simply cannot afford to rely on his memory. In fact, if he tries, the practice usually prevents him from making anything like the best use of his time. He has to act when memories are fresh or he'll forget. Or he has to jump whenever he recalls something important or he'll forget it again.

The good note-taker is spared this kind of capriciousness. He can drop even the biggest problems as necessary, confident that he can pick up the threads at any later time without wasting time trying to remember. This is particularly important for staff meetings and for private sessions where commitments are made, plans are discussed, or problems are outlined.

Good note-taking means just that. "JB— c. r. 17" may mean something while you're talking to the boss (JB) about cost reduction plans for department 17. But chances are that in a couple of days that kind of cryptic note is more a source of confusion than help. You may remember. But then again you may not! Or you may annoy JB (he annoys easily) by remembering only half of what he said.

3. USE A SURE-FIRE REMINDER SYSTEM. This is where you make sure those good notes of yours don't get lost in the shuffle—also that all the big and little things that you can't do at once get put on your schedule of things that are definitely going to get done.

Most formal reminder systems involve the use of cards or file folders. Common names are "tickler" file or "call-up" or "follow-up" file. All do the same job.

The common tendency is not to use such files enough. Often only items of major importance are put on call-up, when actually it would be an enormous time-saver to toss in little notes on virtually everything needing follow-up, whether large or small. Often no notes are needed, of course. Original documents tell the story better.

4. MAKE UP YOUR MIND FIRST TIME AROUND. Especially don't let loose ends always complicate things. Answer your correspondence at once, and you will get rid of 99% of it. You can then concentrate on the special or creative problems involved in the other 1%. Dictate or write that letter at once, even if you don't have the figure or the date you need to put in it. Leave a hole, and delegate someone to get the information. If there must be loose ends, specify who's to do what, and when. If you alone can clean up the loose ends, write down a time to do it, and do it then. "Now" is not *always* the right time, but more often than not it is.

The foregoing doesn't mean you ought to relegate important decisions to the snap-judgment level. That would be ridiculous. But it *does* mean that you may be able to handle far more problems than you do on a fast-judgment basis, merely by overcoming inertia—by driving yourself to clean up minor, pesky problems.

Another advantage of making up your mind fast: You'll do less paper shuffling. It may not sound like much, but it's important when you may have literally hundreds of small items to follow up.

5. MAKE WEEKLY AND DAILY PLANS. In writing. This is *not* a schedule. It means no more than writing down all the important regular, special, and creative jobs you will concentrate on. You can't do them all at once. You probably can't even do them all in the week. But you won't get any of them done unless you move in and start doing them. This you *can* schedule. Decide on the importance of all projects you definitely have to work on. Fit them in order of importance into the pattern of your weekly time budget. If you do nothing more than copy the generalized budget on page 87 and write project assignments for yourself in the spaces, you will have put yourself on the track of getting action.

It is truly amazing, if you've never tried it, to find out how much progress you can make just by stubbornly sitting down to long-standing headache problems and sticking with them. It's like the many stories you read of successful writers who hate to write. They have to force themselves to it, and succeed only by grimly sitting before their typewriters every day, whether they feel like it or not. *They* get results. So can *you*.

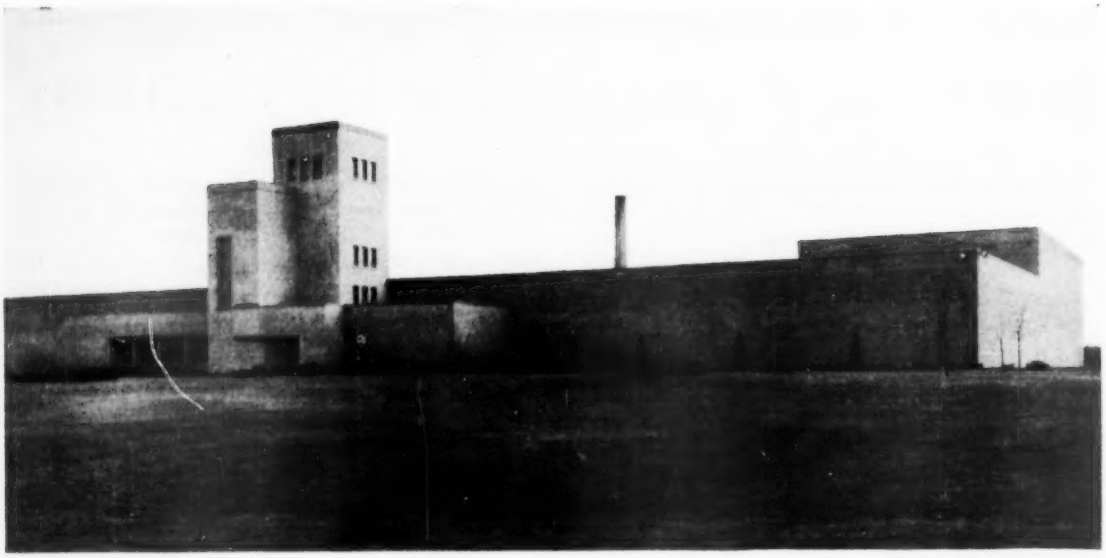
6. CONTROL THAT TELEPHONE. First off, don't answer your own phone if you can avoid it. And give the person who does answer it some guidance as to when you'd prefer to have a message taken so you can call back. You can easily set certain hours, as some executives do, when only the most urgent calls will be put through. And you can certainly see that calls don't come in when they will really hurt (the middle of a grievance, or example). Simple? Certainly is, but more honored in the breach than in the observance.

7. MAKE DATES SPECIFIC. Joe wants to discuss something, so he calls you up. When can you and he get together? Any time? That's the wrong answer. "Any time" may be the worst possible time for you if Joe busts in just as you're calling a staff meeting to order. Tell Joe "now," or "11:30," or some other specific time. And see him as soon as he shows up. That saves his time—which costs money, too. It also has a very good effect on Joe if you have to chide him for keeping *you* waiting!

8. GIVE ADVANCE NOTICE OF MEETINGS. Include some idea of what the meeting's to be about, too. Let people know what you'd like them to bring with them. Give them enough guidance about preparations so you don't spend half the time trying to get started. This has a reverse side, too. When *you're* called to a meeting, same thing applies. Go as well prepared as you can, and you'll probably get away a lot faster.

9. KEEP CHIT-CHAT UNDER CONTROL. Purely social conversation is a vitally important part of business relationships. It's pleasant. It's good for morale. But it can easily be overdone. A few pleasantries are fine. A 20-minute exploration of how the wife wrecked the new Ford is a good solid chunk of at least 19 wasted minutes.

10. WARNING—DON'T BE A FIDGETER. There's nothing worse than the executive who's so fearful of wasting a second that he literally sits on the edge of his chair and times every visitor. Carried to such extremes (and it happens, too), the urge to save time results all too often in actually wasting it. Your visitor catches the disease while he's with you. Like as not he hurries so that he doesn't tell you all you ought to know. Or he doesn't really understand what you told him because you hurried it to get rid of him. Then you wonder what happened as you spend an hour or two later straightening out some mess that could be attributed to poor communication in that meeting where you saved all of two or three minutes.



At Auto Specialties' windowless plant...

Comfort Cooling Keeps Absentees at 1%

WHEN WE BUILT THE PLANT you see pictured here, we air-conditioned it—primarily for comfort.

Has it paid off? We think so. Our work force varies between 350 and 400—and in the six years that the plant has been in operation there have been *no* complaints about working conditions.

Absenteeism is less than 1%. And it's no higher in the summer than in the winter.

There is no doubt in our minds that favorable climatic conditions lend themselves to more and better work. There is no summer lag in production at our plant—and we know that in some plants output drops as much as 25% on hot, muggy days.

Further, because of the air conditioning, our shop is clean. This means a big reduction in wear and tear on our machinery.

We can't give you cost figures that would mean much. Since our plant has always been air conditioned, we have no "before-and-after" productivity figures. And since our plant is windowless, and therefore easier to air-condition (that's *why* it's windowless), our cost figures would not be applicable for a conventional plant.

But you'll be interested to know that the reduction in heating costs in our windowless plant more than pays the cost of operating the air conditioning system. We're sold on the plant, to the extent that a new plant we plan for the near future will also be windowless and air conditioned.

The space conditioned is 811,200 cubic feet. It consists mostly of machine shops and assembly space (we manufacture a disc brake and clutch used by farm equipment and other manufacturers).

CONDITIONS MAINTAINED • During the winter, the temperature in the shop is kept at 72 degrees, the moisture content of the air at 48 grains per pound, giving a relative humidity of about 40%.

During the summer, we keep the temperature at 72 degrees—or 10 degrees lower than outside temperature, whichever is higher. This means the inside temperature is 80 degrees when it's 90 outdoors. Although our system is perfectly capable of maintaining 72 degrees no matter what the outside conditions are, we let inside temperature go up to reduce shock effect on leaving the building.

Doesn't that mean the temperature in the shop can go even higher than 80 degrees? And isn't that awfully hot?

The answer to the first question is yes; to the second, no. Our workers still feel cool because the amount of moisture in the air is kept constant at 75 grains per pound. With a constant moisture content, as the temperature goes up, the relative humidity goes down.

And as the relative humidity goes down, the air can absorb more and more moisture. Therefore, more and more moisture is evaporated from the workers' bodies, causing a cooling sensation.

For the benefit of the uninitiated, temperature,

SUMMER TEMPERATURES are kept at 72 degrees or 10 degrees below outside temperature, whichever is higher.

By PAUL A. MESSER • Manager
Auto Specialties Manufacturing Company
Hartford, Mich.

moisture content, and relative humidity are interdependent. Given two of them, you can calculate the third. As far as air conditioning is concerned, you can control the first two. You can heat or cool the air by passing it over coils containing either steam or cold water. You can control the moisture content of the air by adding or drawing water from the air as it passes through a dehumidifier.

By controlling these two, you control the relative humidity—which is what controls the "cooling sensation." There is no straight-line relationship, but crudely: If the moisture content is held constant, as the temperature goes up, the relative humidity goes down. For example, with our constant moisture content of 75 grains per pound, the humidity at 72 degrees is 45%—a comfortable set of conditions. If the temperature should go up to 90, the relative humidity would be down to 34% —again a comfortable set of conditions.

In addition, all air entering the plant is filtered electrostatically, and 98% of all dust particles removed.

You can see now that we meant what we said about the system being primarily for the benefit of the workers. If we had machining tolerances in mind, we'd keep a constant temperature, to eliminate dimensional changes. Of course, by keeping the temperature under control, we decrease dimensional changes—an incidental, but highly desirable, benefit of the system.

THE COOLING SYSTEM • Outside air — 1500 cubic feet per minute—is brought into the plant through roof ducts. It is first passed through the dehumidifier (we use a lithium chloride absorption machine) which adjusts the moisture content of the air to give us the desired level of 48 grains per pound in winter, 75 in summer. In summer it's always necessary to take moisture out of the air to meet the standard. This is also the usual situation during the winter, but on some winter days moisture must be added.

Next, the air is separated into 14 ducts, which lead to the 14 distribution spots in the plant and offices. As it nears the room, it is joined by "return air" from the room, which is being recirculated. Because the "used" air is recirculated in this way instead of being exhausted, and because there is very little leakage through the walls of our windowless plant, the pressure inside the building is about 17.7 pounds per square inch, as opposed to an average outside atmospheric pressure of about 14.7 pounds per square inch. Of course this causes an outward flow, or leakage, of air at all times and prevents any "contamination" of conditions in the plant by outdoor conditions.

Just before entering the room, the air is filtered by an electrostatic dust remover. These units (there are, of course, 14, one in each duct) employ 6000 volts on the ionizing circuit (which charges the particles), 13,000 on the plate circuit (which draws the particles out of the air). The dust is carried away in an oil sludge, which is removed from time to time.

Finally, the air is heated or cooled to the desired temperature. There are two thermostats in every room. If the temperature falls too low in the room, one thermostat causes steam to be put in the coils of the unit. If the temperature overshoots and goes more than 2 degrees above the desired temperature, the other thermostat causes well water to enter the coils. (No refrigeration is needed. Our well water —at 52 degrees—is cold enough to do the job.)

Note that there is a 2-deg. differential in the thermostat settings—the heating (steam) thermostat is set two degrees below the cooling (well water) thermostat. The reason: to eliminate seesawing between the heating and cooling systems.

For example: If the two thermostats were set at the same temperature, as soon as the heat was brought up to the desired temperature the cooling thermostat would cut in. With the 2-deg. differential, the heat can overshoot up to 2 degrees above the desired temperature without actuating the cooling system.

This also means, of course, that normally during the winter only the heating thermostat is actuated; during the summer, only the cooling thermostat.

And, of course, after the air is heated, it is distributed to the room by the heating unit fans. Ultimately it is recirculated or leaks out through the walls of the building.

DEMONSTRATION DEVICES LIKE THESE ——→

Make Statistical Methods Easier to Understand

How DO YOU SELL PEOPLE in your plant on the idea of using statistical methods in their work—whatever it is?

"With gadgets," says Robert Wagenhals, director of quality control at The Timken Roller Bearing Company. "We use demonstrators to make statistics interesting and understandable to all levels in the plant."

Using this approach, Timken has developed some effective devices to show how and why statistical controls work.

Here FACTORY describes five of these devices and tells you how to build—or buy—them.

You'll find these methods a big help in convincing anyone of the advantages of using statistical controls—for all phases of industrial engineering.

Work sampling, for example (FACTORY, July 1952, p. 83) will be more easily understood by anyone who has taken part in these demonstrations.

If you are hazy about some of the statistical quality control theories mentioned here, ask your quality control engineer—or consult *Quality Control Handbook* by J. M. Juran (McGraw-Hill Book Co.).

SAMPLING DEMONSTRATOR

Purpose. To show relative effectiveness of 10%, single, double, and sequential sampling methods.

What it is. Timken uses a Plexiglas bowl, plastic balls, and four sampling paddles. The bowl is 12 inches long, 8 inches wide, and 8 inches deep (inside dimensions), with curved bottom and straight sides. There are 1500 13/32-in. plastic balls; usually 60 of them (4%) are red, the rest are white. The sampling paddles are made of ½-in. Plexiglas, 8 inches wide, to fit the bowl snugly. Each paddle has indentions for a different number of balls: 150 (for 10% sampling), 115 (single), 75 (double), and 30 (sequential).

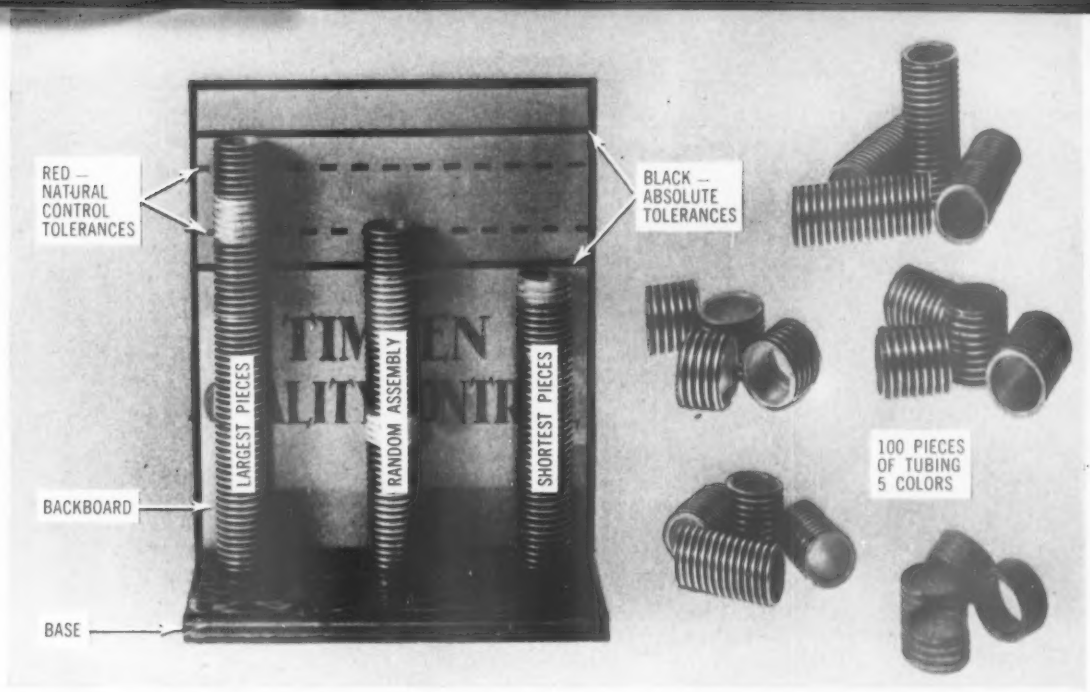
How it's used. To demonstrate 10% sampling, a volunteer runs the 150-hole paddle through the bowl of balls, filling every hole, then counts the number of red balls he picked up. If there are 6 or less red ("defective") balls in the paddle—4% of the sample—that sample is accepted. If there are 7 or more, the sample is rejected. The instructor records each result on a tabular record sheet. Usually 20 drawings are enough.

Single, double, and sequential sampling plans are demonstrated in the same way. A by-product of the demonstration is proof that single, double, or sequential sampling plans are more effective than 10% sampling.

Other uses. The same method can be used to pretest —or to verify—other sampling plans. First, determine lot size. Then make new paddles, or block off holes as desired. Run through enough samplings to show how soon you can spot defective lots.

Cost. $25 to $100, depending how fancy you want it. Plastic is available anywhere. Balls cost under $1 a hundred. (You can get them from Ace Plastic Company, 9130 Van Wyck Blvd., Jamaica, N. Y. Use the same balls for the 100% inspection demonstration.)

Plans and instructions. Write Director of Quality Control, The Timken Roller Bearing Company, Canton, Ohio.



ASSEMBLY TOLERANCE DEMONSTRATOR

Purpose. To show that when component parts made by a quality-controlled process are assembled at random, the sum of the component tolerances is well within the tolerance range for the assembly; and that even selection of components with extreme tolerances cannot throw the assembly outside of absolute tolerance limits.

What it is. You need 100 pieces of aluminum tubing cut to specified lengths and painted; a backboard, and a base to hold it.

The tubing is 1¼ inches in diameter, with ⅛-in. walls. After pieces are cut to specified lengths (see below) tubing is machine-grooved and painted. Then paint is polished from the ribs, leaving bands of color in the depressions, so they won't wear off.

Here is the number of pieces of each length for each color group:

BROWN: 1—2⅝"*, 2—2¾", 4—2⅞", 6—3", 4—3⅛", 2—3¼", 1—3⅜"*

BLUE: 1—1½"*, 5—1¾", 8—2", 5—2¼", 1—2½"*

GREEN: 1—¾"*, 2—13/16", 2—⅞", 3—15/16", 4—1", 3—1 1/16", 2—1⅛", 2—1 3/16", 1—1¼"*

RED: 1—1¼"*, 4—1⅜", 10—1½", 4—1⅝", 1—1¾"*

YELLOW: 1—9/16"*, 2—⅝", 4—11/16", 6—¾", 4—13/16", 2—⅞", 1—15/16"*

* Wrap iron wire in deeper grooves before painting to permit magnetic separation of largest and smallest from each group.

The backboard can be made of ¼-in. plywood or tempered hardboard, 11½ inches high by 10 inches wide. It stands in a wood base, 10x5 inches, ¾ inch thick. Cut slot at the back of the base to hold backboard.

Assemble and paint base and backboard, then paint limit lines on the backboard:

For absolute tolerance limits, paint solid black lines 6 11/16 and 9 13/16 above the base.

For natural control limits, paint broken red lines 7½ and 9 inches above the base.

Or use colored adhesive plastic tapes instead of painting the lines.

How it's used. Pick out the longest and shortest pieces from each group with a permanent magnet. Stack all the long pieces in one pile (left, above). Then stack all the shortest pieces in another pile (right, above). These two piles show that if you assemble all longs and all shorts, the assemblies will just touch the absolute limits.

Now mix all the pieces together again. Pull out five different pieces, one of each color, at random, and stack them up. The chances are 997 out of 1000 that this stack will come within the broken red lines of the natural control tolerances. Repeat the random stacking as often as desired.

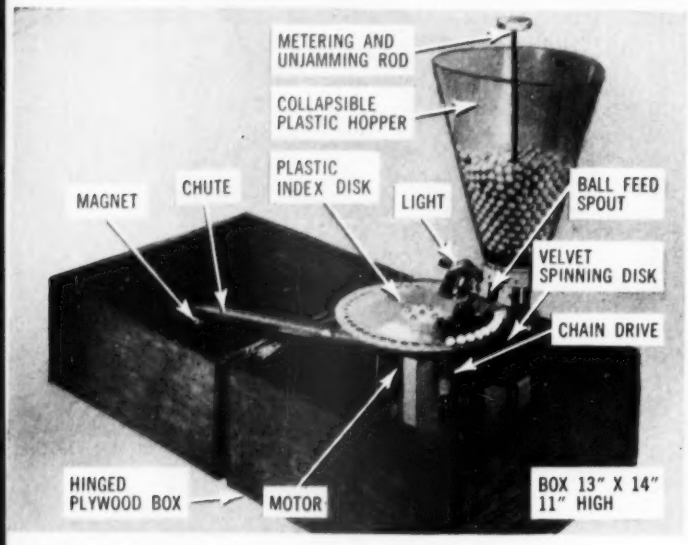
For an effective presentation, place tubes in cloth bags, by color, and have a volunteer draw one from each bag without looking.

In every case, not more than two stacks of tubes should be drawn at a time. After that tubes should be replaced and mixed again.

Cost. If you use scrap, materials for this demonstration shouldn't cost more than the labor required, plus the magnet. Maximum cost, $100. A cheaper method would be to use wood dowels, with steel plugs for magnetic separation.

Plans and instructions. Complete above.

Turn the page



100% INSPECTION MACHINE

Purpose. To show that 100% inspection does not result in 100% perfection. In the past many manufacturers have relied on 100% final inspection to remove defective parts or products. This device, presenting very obvious defectives at a reasonable rate, will show that practically no one can sort out all bad material from a lot. Matter of fact, only 5 people in 1000 have actually removed all defectives with this demonstrator. Average performance is 85%.

What it is. The machine above, powered by a small, 11-rpm. display motor, meters small white plastic balls to a plastic indexing disk at a rate of approximately 200 balls per minute. Another velvet-covered disk, revolving below it, keeps the balls in the index holes and spins them slowly. Object is for the "inspector" to spot defective balls before they drop into the chute.

There are 3000 balls in all. Four types are used; 2000 solid balls, 700 drilled balls, 300 balls drilled and filled with a brass pin, and 100 drilled and filled with a steel pin. Balls with steel pins are classed defective, and are marked K, H, S, or Y. All OK balls are either plain or marked X, N, 8 or T.

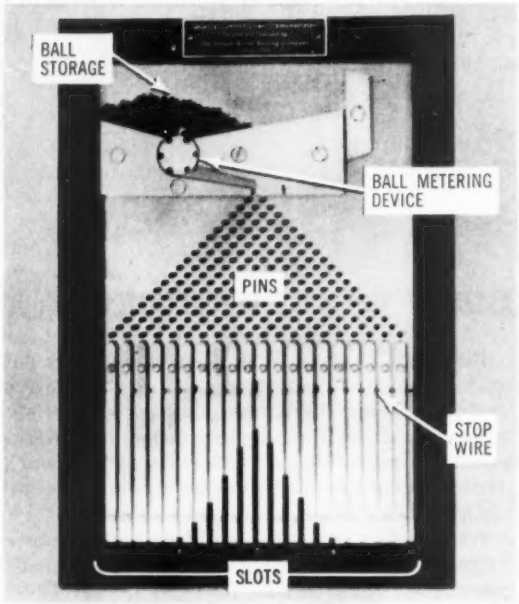
When the "inspector" misses a steel-plugged defective, it sticks to a powerful magnet at the bottom of the chute. All good balls roll past the magnet.

How it's used. Before staff employees, foremen, line executives, line employees, or customers. The instructor picks a volunteer "inspector" from the group—one who thinks he can spot all the defectives. The inspector is shown each type of defective ball. He's told that once the machine is started it won't stop until he's inspected 3000 balls. And he's told to pull defectives from the index holes as soon as he spots them. The demonstration takes about 25 minutes.

Other uses. To test regular inspectors. And to test aptitude of potential inspectors.

Cost. $200, maximum. Can be made from low-cost items and shop scrap. Make as fancy or as large as desired.

Plans and instructions. Available from The Timken Roller Bearing Co., Canton, Ohio. Free.



CONTROL CHART DEMONSTRATOR I

Purpose. To teach control chart theory. To show that any machine or process being run with one objective (i.e., to make pieces the same size) will produce pieces to conform to a normal distribution. This applies to size, surface finish, or any other controllable quality.

What it is. The device is a glorified pin-ball machine, called Quincunx. In it, black steel balls are released into a triangular maze of steel pins. The balls work their way down through the maze and enter any of 21 slots. A removable stop wire prevents them from dropping all the way down, if the instructor wants to use it.

The Quincunx measures 10 by 14½ inches in size, 1 inch thick. It's framed in black with a gold interior, and is made of aluminum. Included are 300 ⅛-in. diameter steel balls. A glass bubble-type level is mounted on the back to aid in leveling the device—an essential to get a normal curve.

How it's used. The instructor masks the area below the stop wire. Then he meters the balls in a standard sample size (usually five at a time) into the maze. Care is used to release balls slowly

enough so they don't bump one another. After a group of five balls is on the wire, the instructor records the average and range of slot numbers on Average (X) and Range (R) control charts. He does the same after each drop of five. He drops at least 30 groups of 5 balls.

At the same time trainees are asked to keep an accurate tally by individual groups of the number of balls that fall into each slot.

Before the demonstration is finished, a simple explanation is made also of the theoretical percentage of balls that should fall into chance (standard deviation) zone: $\pm 1\sigma$ (68.3%), 5 center columns; $\pm 2\sigma$ (95.5%), 9 center columns; and $\pm 3\sigma$ (99.7%), 13 center columns.

The mask is then removed and the distribution of balls in the slots is analyzed according to zones.

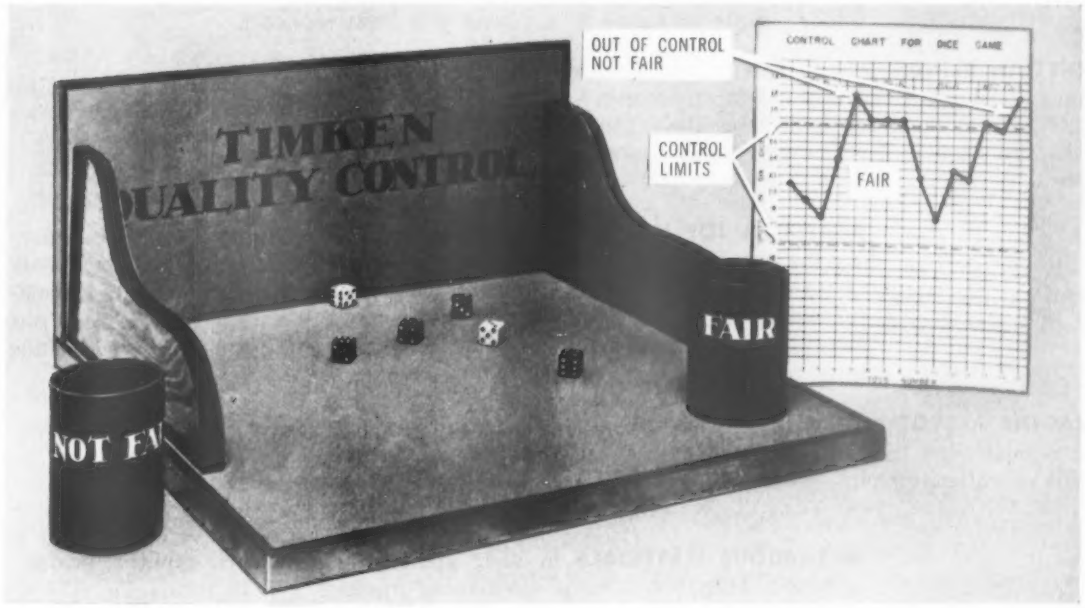
This distribution has always been very close to the theoretical number for each zone. The ability of the instructor to accurately predict the outcome is impressive to the trainees.

Control limits are also calculated and applied to the X and R control charts to show they are in control.

Other uses. By tilting the Quincunx left or right, skewed curves can be produced to demonstrate a condition out of control.

Cost. This device may be bought currently from Timken for $160. Or it may be built by the user from shop scrap. Precision construction is essential.

Plans and instructions. Available from The Timken Roller Bearing Company, Canton, Ohio.



CONTROL CHART DEMONSTRATOR II

Purpose. To show how a statistical control chart will tell you when a fundamental change in a process has occurred. Or when a process goes out of control.

What it is. Make a dice board, 18 by 18 inches, with sides and a 9-in. high back. All contact surfaces are linoleum faced. Two standard leather dice cups are used, one marked FAIR, the other marked NOT FAIR.

And two sets of six standard ⅝-in. dice are used. One set is fair. The "not fair" set has on each die 2 sizes, 2 fives, 1 four, and 1 three. Dice can be "fixed" in the shop—just plug and redrill spots.

How it's used. The instructor calls a "gambler" from the audience. He's asked to roll the dice from either cup, after he's been shown the difference in the dice. He is to make at least three successive rolls before changing to the other dice.

After each roll he reports face count of the dice to the instructor, who stands with his back to the dice board and plots face count of each roll on a large control chart. Control limits on the chart are 13.7 and 28.3.

Object is for the instructor, with his back to the dice board, to tell when the "gambler" switches from one cup to the other within three rolls after the change. The volunteer is encouraged to switch dice frequently to try to outwit the instructor. Often a change can be caught on the second roll. (*Caution:* Don't mix fair and unfair dice.)

Cost: Under $20.

Plans and instructions. Complete above.

IDEAS OF THE MONTH *for*

By LEWIS K. URQUHART • Managing Editor

CONVEYORS FOR RENT Yessir. Rapids-Standard Co., Inc., Grand Rapids, Mich., will now install its gravity and belt conveyors in your plant—anything from a single unit to a complete system. You pay a fixed monthly charge for the use of the equipment. Rapids-Standard takes care of insurance, maintenance, repairs.

SCALE MODELS need no special plug from this department. But we think we ought to tell you that Atkins & Merrill, Inc., Boston Post Road, Sudbury, Mass., has been at it for a dozen years—and can produce exact replicas in wood, plastic, or metal of anything you want replica'd.

VENETIAN BLINDS are wonderful. And no longer a headache for the maintenance department that has a Jetspray laundryunit (L. C. Robinson Mfg. Co., 522 N. Rural St., Indianapolis 1). Costs $395. Takes only 3 or 4 minutes to clean and rinse an average-sized blind. Does slats, tapes, cords all at the same time.

REMEMBER JOE MAGEE? The cartoon character General Electric used during the war to illustrate good welding technique in its training films? Well now you can get Joe Magee decals for your welders' helmets from G-E welding distributors, or by writing to the company at Schenectady 5, N. Y. Free. Every welder should have one. Shows Joe executing a flawless weld while lying on his back.

IMAGINE A STOPWATCH that doesn't have to go back to the manufacturer for repairs! It's the Clebar—which has a tiny built-in compartment that holds seven spare parts. Your local jeweler can install. Clebar Watch Agency, 521 Fifth Ave., New York 17.

HAZARDOUS MATERIALS in your plant? Such as acids, naphtha, lacquer, acetone? Then you'll want Quik-Label markers (W. H. Brady Co., 727 W. Glendale Ave., Milwaukee 12). They stick fast to glass, metal, wood, plastic, or ceramic containers without moistening. Made of strong cotton cloth, silicone-coated to resist oil, grease, grime, and abrasion.

ILLINITE FILE KIT contains an assortment of the twelve basic file shapes normally needed in die filing work. A pocket for each file. $12. Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39.

PORTABLE MICROFILM READER is a companion unit to Diebold's Flofilm camera. Weighs only 19 lb. Costs $250. Now you can have a complete microfilming system for $1000. Diebold, Inc., Canton 2, Ohio.

AIRTUBE SYSTEM recently installed by Deming Co., Salem, Ohio, reminds us to remind you that Airtube (Lamson Co., Syracuse, N. Y.) can help you, too, to speed orders, invoices, blueprints, even small parts around the plant.

WATERLESS WASHSTATION (Sugar Beet Products Co., Saginaw, Mich.) brings washroom to workers. Provides right amount of skin cleanser, a paper towel, and a receptacle for used towels—*all in one unit.*

Factory Executives

NEW POLYETHYLENE DRUM LINER is easier to use because of its circular disc bottom. Disc is fiber—and placed between two layers of poly-etc. Liners are available for use in drums up to 55-gal. capacity. Mehl Mfg. Co., a division of Sydney-Thomas Corp., Cincinnati.

NEED ANY TRAYS to handle small parts? Don't buy till you've seen Jered's. They're custom-engineered in a variety of colors to facilitate identification of contents. And fabricated from U.S. Royalite or Boltaron—which means light in weight, stainproof, greaseproof, shatterproof. Jered Eng. & Mfg. Co., Box 5237, Detroit 35.

CURTA CALCULATOR (says Curta Calculator Co., 5543 S. Ashland Ave., Chicago) combines the versatility of a large desk calculator with the portability of the slipstick (at which we were never very fast). It adds, subtracts, multiplies, divides, gives you cube and square roots. Weighs only 8 oz. and qualifies for Joe Cook's world-famous collection of objects "no bigger than the palm of a man's hand."

ONE-A-MONTH information kit describing permanent magnet application ideas for industry has been announced by Carboloy Department of General Electric Co., Detroit 32. You get a binder with the first six ideas—and a new application sheet every month.

SLIPRUF is a non-skid coating for hammer handles. Greaseproof, sweatproof. 'Nough said? Write Custanite Corp., PO Box 66, Larchmont, N. Y.

BOOKLET OF THE MONTH is latest, most elaborate of G-E's "See Better—Work Better" bulletins. In full color. Includes "Here's What Is Happening to Industrial Lighting," "Comfortable Working Environments Pay Off," and "Another Look at the New Look." For single copies—free, of course—write Inquiry Bureau, G-E Co., Nela Park, Cleveland 12.

CHANGEABLE TYPE BARS for electric typewriters are now available. For use in operations that require chemical, mathematical, or other scientific or foreign language symbols. Can be readily replaced by typist. International Business Machines Corp., 55 Liberty St., NYC.

LITTLE BULL is a portable power megaphone that could be mighty handy in a pinch. Weighs 5½ lb. Powered by flashlight batteries. Range—up to ¼ mile. Price $124. Austin-Lee, Inc., Little Bull Power Megaphone Div., 1624 Eye St., NW, Washington 6, D. C.

TWO-STATION WIRELESS INTERCOM, now available, costs only $95. Additional stations, $50 apiece. Uses existing power lines. David Bogen Co., Inc., 29 Ninth Ave., New York 14.

NOW IT'S WHITE BLACKBOARDS, and dust-free to boot. Write on Wyte-Bord with colored crayons, wipe 'em off with cheesecloth. John Tyler Distributors, 17 John St., New York 38.

1 **THE BEST SAFETY DEVICE IN THE WORLD.** "It's you," says author Noa to Bill Babcock. To dramatize, Noa shows picture of man at machine, suddenly flips picture over. Bill then sees himself in mirror on back.

These 11 ideas helped...

Cut New-Worker Accidents 78%

By ASA P. LOMBARD • Safety Engineer, and WILLIAM D. NOA • Assistant Safety Engineer, The Bullard Company, Bridgeport, Conn.

THE HIRING OF NEW, UNSKILLED WORKERS has for years presented a big safety problem to many plants. Unless new workers get adequate safety training, their accident frequency rate will be well above that of experienced workers.

This problem has long been recognized. The difficulty has been to develop solutions that really work. There is probably no "one best" solution. But one that works well—certainly at Bullard—is to concentrate on getting new workers off to the best possible start on their jobs.

In other words, the first step is sound safety indoctrination.

Our method of indoctrination is simple. It requires thought and ingenuity rather than any heavy expenditure of time or money. It begins immediately after the new worker has passed his physical examination—before he even reports for work.

The training is designed to dramatize and drive home all plant safety rules and regulations. It is based on the premise that words alone will not get ideas across with fullest impact. So our program is built around the idea of using every possible visual and demonstration aid we can develop to put safety across from the start. The pictures illustrate just a few of the ways in which we do this.

Does it work? It certainly does for us. And we think it will anywhere—without much effort for the results obtained.

A review of our own experience shows that, compared with similar past periods of heavy hiring, we have had a reduction of 81% in the number of days lost per 100 employees, and a 78% drop in the number of lost-time accidents.

It's our opinion that our indoctrination program has greatly aided us in attaining these results. We also feel it has played a definite part in maintaining an accident-frequency record that is well below the national average for our industry.

Now let's see what happened to Bill Babcock when he reported for his safety indoctrination on Monday, November 17, 1952.

2 **"YOU'RE GREEN HANDS** when you come to work," Noa tells new workers, holding up bright green gloves. Then he shows the blood red palms, jars men by saying aim is to keep blood off *their* hands.

3 **MOUSETRAP GETS IN THE ACT,** evidence of the simple devices Bullard uses to enliven safety training. Snapping of trap shows lightning speed with which accidents happen, topples "safety dominoes."

4 **RESOUNDING WALLOP** puts safety shoe to test, and makes Bill wince. He's impressed as he looks over badly scarred shoe, sees that safety toe cap didn't give. He's sold, wants a pair right then.

5 **HOUSEKEEPING DEMONSTRATION** makes dull subject interesting. Noa runs caster over row of nails, shows how wheel pushes heads into floor, throws points up in air to puncture shoes or vehicle tires.

Turn the page

6 **WOODEN VERTEBRAE** help Bill get idea of proper lifting. Author Lombard holds vertebrae while workers look on. Gadget, made of wood, leather, and rubber bands, shows importance of straight back.

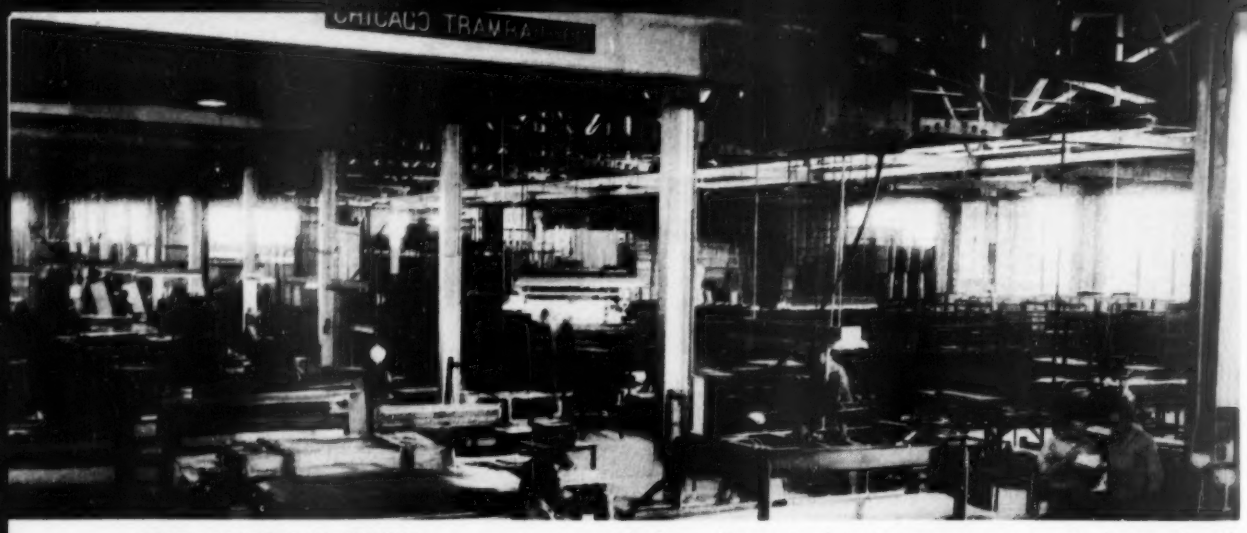
8 **A LOOK AT READER'S DIGEST** impresses Bill and everyone else. The copy they use is in Braille. Lombard asks them to close their eyes to get an idea of how it feels to be blind.

9 **HAMMER MADE OF SAFETY GOGGLE** interests Bill and fellow-workers. Fixing handle to half-pair of goggles spruces up this standard safety demonstration, gives it a lot more impact on new men.

7 **"KEEP THOSE EYES CLOSED,"** says Lombard to Bill, in a continuation of eye-safety talk. Then he gives John a Cigarette, tells him to light up. New workers are impressed to see how tough it is.

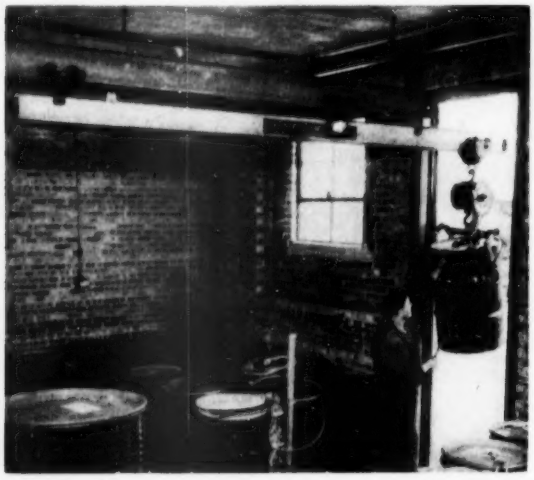
10 **POISON PILL DEMONSTRATION** packs a punch. Here Bill refuses to take a chance on getting one pill out of 330 in bottle that's poisonous. Noa then explains parallel to taking chances on the job.

11 **"WE PRACTICE WHAT WE PREACH,"** says Safety Engineer Lombard. So he takes men on tour of shop while impact of demonstrations is still hot. Men see that safety at Bullard is standard practice.

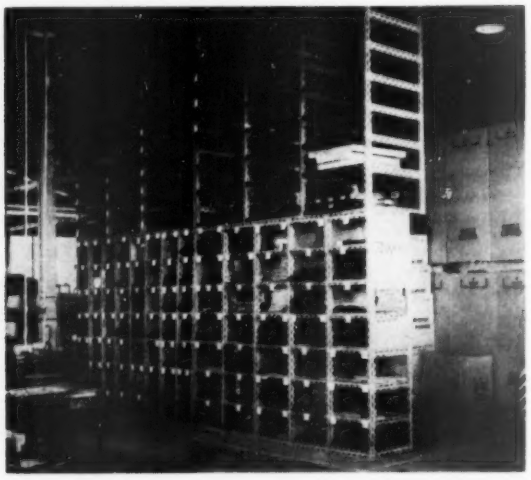


25-FT. CRANE CAN SERVICE a storage area 32 ft. wide—because the craneway runs down the center of the shop. If you build craneway along a wall so that the wall serves as one support, you can't utilize the maximum transverse movement of the crane—load will bump wall while crane is still several feet away. Here complete transverse movement of crane is utilized. And the company saved the cost of seven additional feet of crane. Crane is supported by columns that were needed anyway to support building. They were simply made a little heavier so they would give support to the crane, too.

TELESCOPIC CRANE makes easy work of handling heavy and unwieldy paint barrels. Here the boom is extended to reach out and pick up a barrel from a truck outside. For inside-the-room use, the boom is retracted, hangs underneath main truss, is locked to prevent any sideways motion.



OVER-RUN RACK, located near the assembly area, is used to store extra pieces for assembly. Pieces are kept handy to replace any that may be damaged during the assembly operation. If they're not used, rack holds them neatly, and with little possibility of damage, until next run.



Good Handling Topped the "Must" List

BUILT-IN HANDLING is a 2-word summary of Western Editor Walt Wagner's report on the new Randolph Metal Products plant in Chicago.

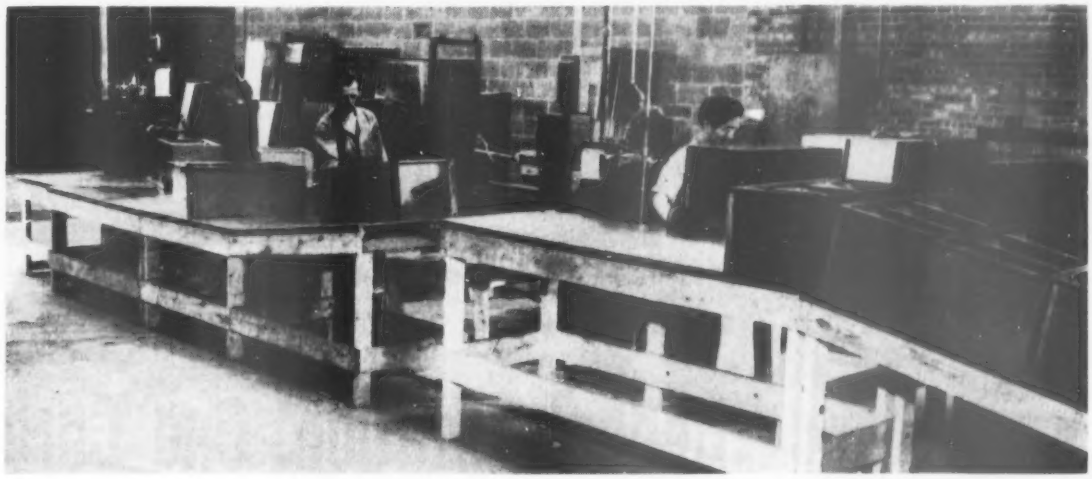
Randolph is a division of Marvel Metal Products Company, whose president and vice president, Ted Krasnow and Marvin Berz, took time out to show Editor Wagner the works.

Out of this 3-way collaboration came the photographs above. Nothing unique in these handling installations. Just good imaginative use of available equipment. The pictures show once more (*we* think) that good materials handling isn't something "for big plants only." They prove again (if *you* still need proof) that lack of size is no

HIGH-STACKING FLOOR TRUCKS provide up to three times as much storage for the same floor area. They are pushed to this nearby storage area and stacked by fork truck. These trucks were designed by Irving M. Footlik, materials handling consultant, working with Plant Superintendent Frank S. Johnson.

STANDARD WORKTABLES have been converted to 2-wheelers at a cost of $12 apiece. Now table and load can be easily pulled from cutoff shear to presses by man with pallet jack. The two legs without wheels prevent the table from moving while it's being loaded or unloaded.

SHEETMETAL CHUTES are used extensively in the shop for short transports (up to 12 feet) of parts between operations. They're seldom seen for moving anything bigger than screw machine products. Randolph uses them because they eliminate lifting (and cut down on damage). They provide continuous flow between operations (including "uphill" movement —operator in center is giving the part an easy push that will slide it to operator at right). They are cheap and easy to build (company built its own). They require a steeper slope than roller conveyors for downhill movements.



When This New Plant Was Built

handicap. You just have to *want* to do a good handling job.

"We started from there," say Messrs. Krasnow and Berz. "Good handling headed the list of things we had to have."

"I could see that the minute I walked in," says Walt Wagner. "The design of the plant proves the point. Finished goods wind up where the raw materials came in. This means complete flexibility at the shipping dock. Any or all of the six docks can be used for receiving or shipping. Only two are enclosed. Studies at the old location showed that up to six docks were needed, but usually only two were in use at one time."

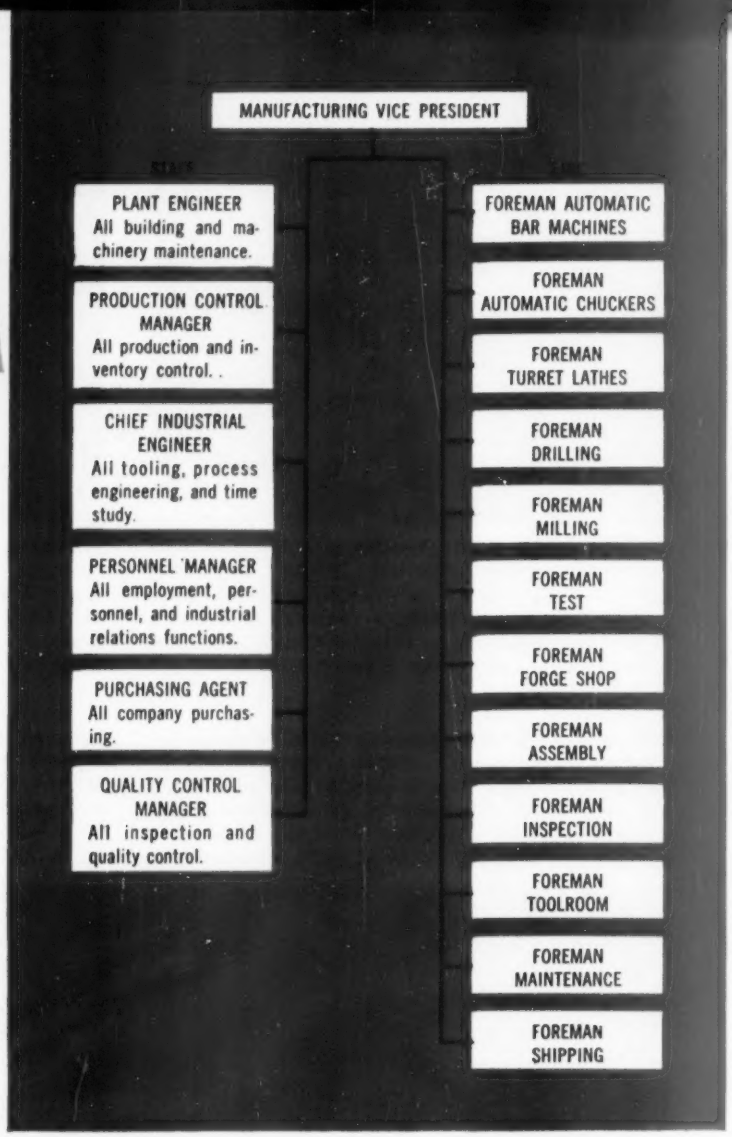
To test your reading ability . . .

Read this article at your normal rate of speed for general information. For test purposes, do not examine pictures or read captions.

Record your exact reading time in minutes and seconds. Then turn to page 316 and answer the questions based on the article.

Decentralizing your manufacturing operations isn't just a big-plant luxury any more. It's just as practical for medium-sized and smaller plants, too. That's Parker Appliance's conclusion after a highly successful experience in setting up four "little factories."

By SCOTT ROGERS
Manager, Jet Division
The Parker Appliance Company
Cleveland



OLD ORGANIZATION CHART looked like this. Six staff men and 12 department foremen reported every day in the year to the manufacturing vice president.

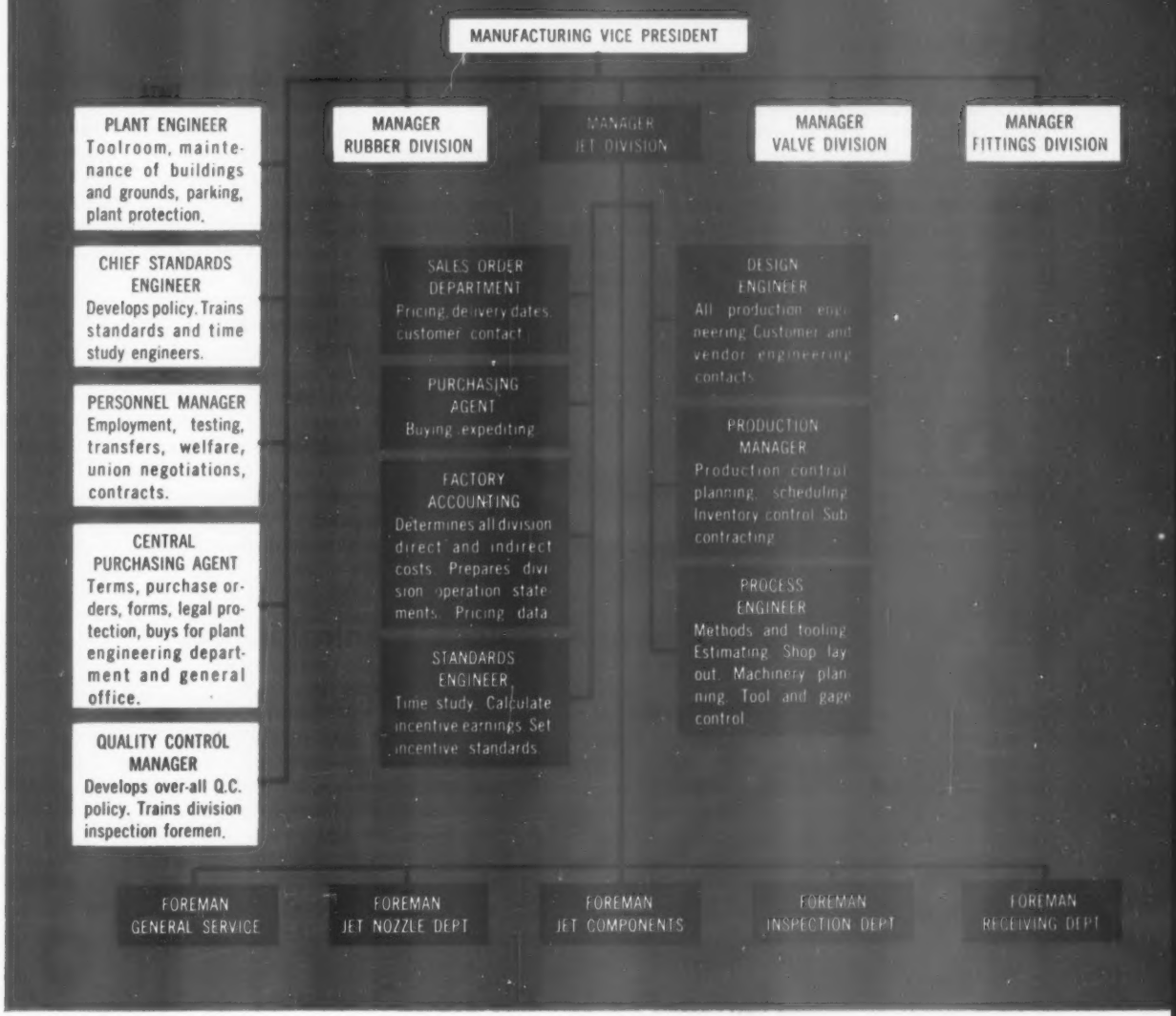
Decentralization: One Cure

FOR YEARS OUR MANUFACTURING at The Parker Appliance Company was organized on a straight "line-and-staff" basis. In fact, as you can see from the chart at the top of this page, we carried the idea pretty far — so far that 12 department foremen in the line organization reported directly to the manufacturing vice president. Six staff department heads also reported to him. This made a total of 18 men—far too many.

But we did nothing about the problem until after World War II, when a crisis gave birth to the decentralized plan we now use.

HOW IT HAPPENED • We were making a particularly difficult assembly for a jet engine. It was the closest job we had ever had. And it was tying the shop in knots. We weren't shipping the assemblies. We were also falling behind on the other products because we had to spend so much time trouble-shooting the jet parts.

Drastic action was called for — and we got it. Our manufacturing vice president appropriated a small corner of the shop. Into it he moved enough machine tools, work benches, and inspection and testing equipment to provide all the facilities


MANUFACTURING VICE PRESIDENT
PLANT ENGINEER
Toolroom, maintenance of buildings and grounds, parking, plant protection.
CHIEF STANDARDS ENGINEER
Develops policy. Trains standards and time study engineers.
PERSONNEL MANAGER
Employment, testing, transfers, welfare, union negotiations, contracts.
CENTRAL PURCHASING AGENT
Terms, purchase orders, forms, legal protection, buys for plant engineering department and general office.
QUALITY CONTROL MANAGER
Develops over-all Q.C. policy. Trains division inspection foremen.
MANAGER RUBBER DIVISION
MANAGER JET DIVISION
MANAGER VALVE DIVISION
MANAGER FITTINGS DIVISION
SALES ORDER DEPARTMENT
Pricing, delivery dates, customer contact
PURCHASING AGENT
Buying, expediting
FACTORY ACCOUNTING
Determines all division direct and indirect costs. Prepares division operation statements. Pricing data
STANDARDS ENGINEER
Time study. Calculate incentive earnings. Set incentive standards.
DESIGN ENGINEER
All production engineering. Customer and vendor engineering contacts.
PRODUCTION MANAGER
Production control, planning, scheduling, Inventory control. Subcontracting.
PROCESS ENGINEER
Methods and tooling. Estimating. Shop layout. Machinery planning. Tool and gage control.
FOREMAN GENERAL SERVICE
FOREMAN JET NOZZLE DEPT
FOREMAN JET COMPONENTS
FOREMAN INSPECTION DEPT
FOREMAN RECEIVING DEPT

NEW ORGANIZATION CHART. Now only five staff men and the managers of the four "little factories" report to the manufacturing vice president. Each division has its own set-up, comparable to that of Jet Division, shown here in black.

for Production Headaches

needed to complete the jet job without help from anyone else. Then he picked a foreman with all-around experience and gave him a select group of machinists, bench hands, inspectors, and testers. They all worked as a team.

Before long, the situation was under control. We were shipping on schedule. At the same time, other foremen — with jet parts out of their hair — were doing better on *their* operations, too.

FOUR LITTLE FACTORIES • That gave us our start. Soon we had converted our whole shop into four almost completely integrated, independent little manufacturing plants, each making its own product line.

As you can see from the right-hand chart above, this wasn't just a matter of providing them with their own special tools and equipment. We even provide them with their own design engineers, sales order department, purchasing agent, and the like. In other words, we deliberately duplicated these basic staff functions four times, in defiance of the "classic" idea that you should centralize such functions.

Turn the page

But we'll get into more detail a bit later on just how these little decentralized factories of ours work. First, I'd like to give a brief rundown on how we like the new plan, and how it works.

SHORT-TERM BENEFITS • Since decentralizing our manufacturing set-up, we're doing better than ever before. Our competitive picture is the best in our history. We've been growing steadily (employment up 104%). We've been making good profits (1951-52 profits were highest since the war). And three of our four manufacturing divisions have cut prices recently — despite higher labor, material, and operating costs. My own division cut its prices an average of 19%.

LONG-TERM BENEFITS • We're now beginning to see evidences of some long-term advantages of decentralization. For example:

1. **We have a solid core of well-trained men for all our key staff and administrative jobs.** That's one big advantage of duplication of functions.
2. **We're more flexible in our operation.** Each division can shrink or expand within reason as business warrants. Should wartime dispersal be necessary, each division could easily pack up and move right out. Should one division outgrow the physical space available within the plant, a move would be equally simple.
3. **Flexibility encourages growth.** Each division can operate with commando-like speed to make a sale or accelerate a schedule. As a result, our Jet Division alone is shipping more than the whole company shipped before our reorganization.
4. **Healthy competition is growing among the divisions.** In itself, that's a big aid to growth and progress.
5. **We're more customer-conscious.** That's because each division's future depends on how well it satisfies its *own* customers.

How We Operate Under Decentralization

As we're now set up, nine people (instead of 18) report directly to the manufacturing vice president. His five staff department heads are responsible for rendering advice and staff service to the whole plant in their specialized fields—plant engineering, personnel, quality control, production standards, and central purchasing.

New to the organization are four divisional managers. They manage the company's four product divisions—the "little factories." Like the staff department heads, they report directly to the manufacturing vice president.

These nine key men meet daily with the vice president. They cover all company matters needing attention—labor relations, incentives, general purchasing problems, manufacturing and shipping schedules, and the like.

Thus, with a minimum of paperwork and running about, top line and staff people keep in touch with one another and with common problems.

How a Typical Division Operates

What we do within the Jet Division is typical of what happens in all divisions. As manager, I have my own production manager, process engineer, standards engineer, design engineer, sales order department, factory accountant, and purchasing agent.

We're not 100% self-sufficient, however. Some non-operating company activities are still centralized. We have found it is cheaper and more efficient to set them up on a company-wide basis. They include employment, industrial relations, general accounting, product sales in field, new product research and development, legal activities, building maintenance, and plant protection.

AUTHORITY AND RESPONSIBILITY • Now let's take a look at the way we handle authority and responsibility within the division. The production manager and process engineer (see chart, page 105, for duties) are under my complete control. But that's not so in the case of the other five divisional staff men—standards, design, accounting, purchasing, and sales orders. These men have "dual citizenship," in a sense.

The plan works like this: Their counterparts on the manufacturing vice president's staff tell them *how* to do their jobs. I, as the division manager, tell them *what* to do, and *when* to do it. In other words, I exercise administrative control over these five divisional staff men.

For example, the chief standards engineer, at top staff level, sets policy and trains division standards engineers. He also follows up and consults with them. But, within each division, the divisional standards engineer is wholly responsible for time study, incentive standards, and incentive pay calculations.

We have surprisingly little confusion as the result of this dual citizenship arrangement. That's because we handle all company policy matters at top-level meetings and keep them separated from divisional problems.

Paralleling this staff group is the divisional line organization. In the Jet Division, this is made up

of five foremen who report directly to me. Two of them are line foremen in charge of the actual manufacturing operations. The other three head up service functions (see chart, page 105).

MAINTENANCE · Although it's not shown on the chart, our maintenance set-up has also been modified to some extent. To improve our preventive maintenance and emergency repair program, we have assigned maintenance men permanently to each division. These men have consequently become expert in the specialized equipment in their divisions. Repair time has dropped off, and overtime, too.

Now we have worked out a preventive maintenance program based on repair experience. And, since the men are right with us all the time, we have no trouble setting priorities for repair jobs. Of course, we also get jobs done faster with this system.

How Workers and Foremen Benefit

Because the first move to reorganize took place in the shop itself, it was logical to expect direct results to show up there first. And that's what happened.

In each division, employees have become specialists on the few products or parts they work on. They make similar parts all day, every day. They no longer worry about tolerances, surface finishes, order of work. Scope of activity is broad enough so that answers to such questions are learned as part of the job. Jobs are orderly now, instead of hectic.

To say that morale has improved is an understatement. Since bench hands and machine operators have fewer decisions to make, supervision is more effective. Gripes are fewer. Buck-passing for errors has dropped way off. The shop has become a happier one in all respects.

The foremen's jobs are easier, too. Since each foreman is responsible for the assembly and test of only a few products, he knows precisely how much he has to put into each part. And the many decisions he has to make each day are simpler because he can see directly the results of his decisions of yesterday.

Foremen have also been able to spot the special skills of workers and reorganize their departments to make those skills pay off. This is largely the result of being freed of operating roadblocks set up by our old organization structure. The foreman now has time to devote to strengthening his department.

Quality control was one of the first functions to show great improvement. With inspection and test right in the division, it has been simple to develop and improve the special techniques and equipment needed for the products of the division.

Inspection is also physically closer to manufacturing, so the time lag between making a bad part and catching it is reduced. And, in turn, we have been getting fewer rejects. That, of course, helps cut unit costs.

Internal Divisional Operation

The physical layout of the Jet Division office is an important asset to our functioning. We occupy an L-shaped area roughly 50 x 50 feet. Within that area we carry on our integrated control of the division's manufacturing job. Each of the other divisions has a similar set-up. Thus there is a decentralized office set-up for each to go along with the decentralized shops.

Here are advantages of the separate office plan:

1. Our customers get quick responses to phone calls, letters, and telegrams. That's because all the staff men who can supply answers are right there on hand. Quick conferences can be held if necessary. The customer's problem doesn't get thrown in with those of the other three divisions.

2. Deliveries are faster, too. Problems of design, tooling, purchasing, production, pricing, and shipment can be resolved right away. In fact, we've saved days in the preparation of quotations, and weeks in getting products through the shop.

And here are a couple of matters we were worried about for a time, but which have worked out to our complete satisfaction:

Under decentralization, vendors had to contact four division buyers and a good many operating staff men to sell their wares. We feared this might scare them off. But it didn't. It actually became an advantage to salesmen because it meant they had four chances, instead of just one, to make a sale. And, from our point of view, we've discovered many new items of equipment that we might never have come upon if we had stuck with a central purchasing plan.

Cost of purchased items is greater because each division, buying for itself, is ordering smaller quantities. But we feel we have made up for this in time we saved learning what we needed, and in better deliveries of promised items. We can schedule order points and quantities more accurately, and our follow-up is better geared to production requirements—not merely original promised dates.

OPERATING SHORTS

Free Washes for Employees' Cars

Free car washes are a popular service for the 2447 employees of Weyerhaeuser Timber Company's Longview, Wash., forest products plant.

Suggested by an employee and built by the millwright department, two automatic washers operate around the clock. They're actuated when an auto is driven over a service station-like alarm hose. Water is pushed out of nine nozzles at 125 pounds pressure for 45 seconds, then shut off automatically by a time relay. Drivers stay in their cars during washing.

Lift Tilts Truck to Dump It

Just one minute. That's how long a hydraulically elevated unloader takes to empty 20,000 pounds of coke from a trailer truck.

Built by Kewanee Manufacturing Company, the unloader speeds shipments of coke and carbon products between Speer Carbon Company, St. Marys, Pa., and Speer's International Graphite & Electrode Division. It tilts the tractor and trailer to a 40-deg. angle, dumping the coke into storage facilities.

Fanfare Puts Zip into Housekeeping

Be neat and beware of "The Order of the Golden Broom, Pail, and Dustpan." That's the word at Fairchild Engine & Airplane Corporation's Stratos Division, Bay Shore, N. Y.

Every Friday a housekeeping committee picks the department that's "least neatest of the week." One of the women in the shop is chosen to present the "award" during the following Monday morning coffee break. Waving the golden broom, pail, and dustpan, she tours the plant escorted by a makeshift musical ensemble. No one knows where she'll stop until she finally hangs the gilded cleaning utensils in the "winning" department.

Worn Abrasive Wheels Re-Used

Once discarded when worn down to 13 inches in diameter, 16-in. abrasive wheels used to cut tubing and bar stock are now re-used at Ryan Aeronautical Company, San Diego, Calif.

How? By fitting smaller saws with an adapter for larger center holes and a guard providing larger clearance. The photo shows a Ryan worker checking clearance.

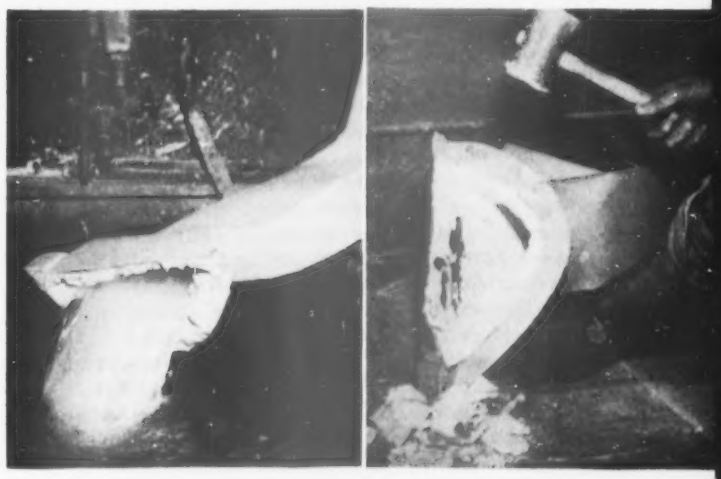
When a 16-in. wheel is ground down to 13 inches, it's installed on a saw that formerly used new 10-in. wheels. At 7 inches it's put on a still smaller saw. When worn down to 4 inches, it's finally discarded.

Parts Patterns Are Water Soluble

Boeing Airplane Company, Seattle, saves time and money in fabricating plastic parts by forming the parts over mandrels cast from water-soluble plaster.

After a part is formed, it's soaked in water to wash out the mandrel, composed of one part potato starch to three parts casting plaster (left). A second baking finishes the job.

Formerly, parts were separated from mandrels by hammering (right). This crumbled the plaster, but sometimes damaged the parts. Damage ranged from 10% to 100%.

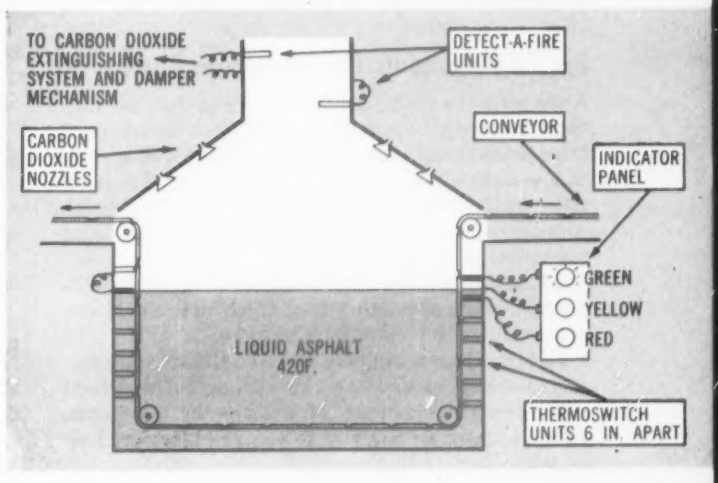


Thermostats Control Liquid Level

A system of thermostats senses the level of hot liquid asphalt in a dip tank at Flintkote Company, East Rutherford, N. J.

Two rows of "Thermoswitch" units are staggered vertically on opposite walls of the tank to measure the liquid level at 3-in. intervals. Depending on the level desired, any three thermostats are connected to a set of three pilot lights.

As the liquid in the tank submerges a thermostat, the corresponding light is extinguished. The lights are red for lowest possible level, *yellow* for safe operating level, and *green* for highest allowable level.



ALUMINUM FOR COPPER:

Aluminum Conductors in

Electrical Editor Joe St. Andre continues his timely series of articles on the use of aluminum in place of copper in plant electrical systems. For earlier articles, see FACTORY, September 1952, p. 132; October, p. 120; December, p. 136.

"THEY'RE USING ALUMINUM instead of copper in so many electrical applications. Why don't they use it in busway?" asked a plant operating man in a plant I recently visited. "I'm sure my electricians would like to install busway systems that are lighter and easier to handle."

I'd been talking in FACTORY about the different electrical applications where aluminum is being used as an alternate to copper. But busway was a field I had not yet explored. Since then I've taken a long look—and I'm now ready to report.

Here, as elsewhere in the plant electrical system, the use of aluminum will depend on its availability and the economies to be realized. In busway, however, the weight of the conductor metal is considerable, so any difference in price between aluminum and copper conductor will show up in even greater savings. In addition, the reduction in weight offers a bonus in easier handling.

But, as in the other applications already discussed, there are certain considerations that must be taken into account before these advantages can be fully realized. With this in mind, I visited several manufacturers of busway to find out what they knew. Bulldog Electric Products Company of Detroit, it turned out, had had seven years' experience with aluminum. Here is what John Herrmann, vice president of product engineering, said.

Six Requirements for Aluminum Busway

Aluminum busway as an alternate for busway systems using copper for conductors must perform mechanically and electrically at least as well as the conventional copper systems. At the same time, aluminum busway must install as easily as copper, with no more trouble or care than good installation practice requires.

Aluminum sections must be interchangeable with present copper installations. Here are six major requirements for aluminum busway:

1. It must be possible to make additions of aluminum busway to existing copper bus bars without any change in method of making bolted joints, manner of preparing the joints, or tools required to make such joints.

2. It must be possible to disassemble and reassemble or salvage aluminum bus bars with the same ease as copper bars.

3. In plug-in busway systems, it must be possible to install the same plugs with the same ease and reliability as on previously installed copper bus bars. You should not have to carry two different kinds of plug-in devices in your storeroom.

4. Contact surfaces must be able to withstand normal corrosion occurring in industrial plants not only after connections are made, but also during transportation and while being stored.

5. Aluminum busway must have adequate mechanical strength, comparable temperature rise, and satisfactory voltage-drop characteristics.

6. It must be possible to bolt up the joints to get adequate contact pressure and to retain such pressure over the life of the installation.

Seven Factors for Trouble-Free Operation

To meet the above requirements and insure trouble-free operation, aluminum busway designers should take into consideration the following factors:

1. Formation of aluminum oxide at the connection points. This oxide acts as an insulation and produces high-resistance joints, resulting in heat and eventual destruction.

2. Corrosion problems where the aluminum contacts copper in a joint.

3. Difference in size of bus bars, due to the difference in electrical conductivity.

4. Mechanical strength to withstand short-circuit stresses in case of trouble.

5. Cold flow at bolted and other connections.

6. Aluminum's higher coefficient of expansion under heat.

7. The relative weights of completed sections of aluminum busway compared with copper.

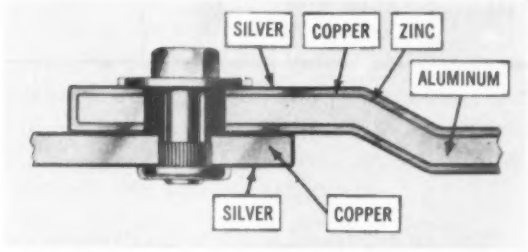
Bulldog's Solutions

The engineers at Bulldog solved these problems by designing as follows:

1. The practical answer to the problem of resistance at connections caused by aluminum oxidation

Busway Systems

was the use of a zinc-copper-silver plating treatment of the bus bars. Facilities have been installed to plate the entire 10-ft. length of the aluminum bus bars used in both Bulldog's Plug-In and the Lo-Reactance Feeder busways. Prior to the copper plating, the bus bars are subjected to a zincate bath that completely covers the bar with a thin coating of zinc to seal the cleaned aluminum bar from any re-formation of aluminum oxide. Copper, of sufficient thickness to provide adequate protection and a good hard surface, can then be quite readily plated on this zinc surface. This will withstand the abrasion from the insertion of plug-in fingers and from the usual handling and cleaning of the bars



SILVER-TO-SILVER CONTACTS prevent oxidation and corrosion where aluminum bus bars are bolted to existing copper bus.

at bolted joints. The silvered surface provides a means of preventing the formation of copper oxide and assures a cool operating contact surface. Such silvered surface, even though tarnished, should not be removed.

2. The problem of corrosion where the aluminum bars would come in contact with other aluminum bars or other metals was also solved by the zinc-copper-silver plating treatment. Bulldog's copper bus bars also are plated with silver, so joining Bulldog aluminum and copper systems results in silver-to-silver contacts. No special skill or preparation is required to make the joints.

3. The engineers specified aluminum bus bars in sizes having conductivity comparable to, and under certain circumstances superior to, that of copper. The difference in voltage drop for the two metals is negligible. (See table on page 112.)

4. A special and more expensive, cold-worked, extra-hard aluminum bus bar provides high mechanical strength against possible short-circuit stresses for all ratings. It also assures excellent endurance and long life.

5. It was found that specially designed spring cup washers used at the bolted connections can give adequate contact pressure to assure good conductivity and can maintain the pressure over the life of the installation. This pressure is spread over a great enough area, and the washer has sufficient flexibility, to eliminate any problems of expansion or cold flow, even at temperatures considerably in excess of those at which the busway normally operates.

6. Differences in the coefficient of expansion between conductor and enclosing case made it no more difficult with aluminum than with copper.

7. Light weight was one of the outstanding advantages of aluminum. It is up to 41% lighter than copper duct, in some cases. The lighter metal makes possible easier handling, lighter mounting supports, and less strain on the building structure.

Since stab contact fingers on the plugs engage the bus bars of plug-in duct with a considerable spring tension, tests were conducted to determine that the plating on the aluminum bus bars would not be damaged by the insertion of the fingers.

UL Corrosion Tests

The Underwriters' Laboratories made the following corrosion tests of joint connections, using silvered copper-plated aluminum bars as compared to the conventional silvered copper bars:

1. Salt spray. A 20% by weight solution of sodium chloride was used. The apparatus was operated continuously, except for a short time during which the specimens were examined. The test chamber was held at room temperature, 24C.

2. Carbon dioxide and sulphur dioxide. Air saturated with water vapor at room temperature (24C.) and containing 1% carbon dioxide and 1% sulphur dioxide by volume was used.

3. Hydrogen sulphide. Air saturated with water vapor at room temperature (24C.) and containing 1% hydrogen sulphide by volume was used.

4. Hot moisture. Air saturated with water vapor (distilled water) at approximately 40C. was used. Test was so arranged that the water vapor would condense on the test samples and trickle over the bolted connections.

Short lengths of bus bars were bolted together, as in a typical joint between sections. These samples consisted of the conventional silvered copper bars and the silvered copper-plated aluminum bars. Three such samples were placed in each test atmosphere, while other bars stayed in ordinary room temperature and moisture conditions.

Resistance measurements of the joints were made prior to the test and each week thereafter. Each week the test samples were dried in an oven at 85C. prior to making the electrical resistance test.

After seven weeks of tests in all of the above conditions, the silvered copper-plated aluminum samples showed practically no difference in resistance readings. Neither did the silvered copper bars used for comparison. *Turn the page*

HOW ALUMINUM BUS BARS COMPARE WITH COPPER IN SIZE... WEIGHT... VOLTAGE DROP

Rating in amperes	Size of bus bars per leg		Weight per 10-ft. section in pounds (3-pole duct)		Maximum voltage drop at rated load at 85% P.F. (100 feet)	
PLUG-IN DUCT	**Aluminum**	**Copper**	**Aluminum**	**Copper**	**Aluminum**	**Copper**
400	¼ x 2	¼ x 1½	100	124	4.48	4.08
600	¼ x 3	¼ x 2	128	140	4.68	5.60
800	¼ x 4	¼ x 3	138	190	4.80	5.40
DISTRIBUTION DUCT						
800	2–¼ x 1½	2–¼ x 1	143	165	4.00	3.92
1000	2–¼ x 2	2–¼ x 1½	157	200	3.80	3.40
1350	2–¼ x 2½	2–¼ x 2	174	234	4.32	3.55
1600	2–¼ x 3	2–¼ x 2 7/16	194	266	4.16	3.52
2000	2–½ x 4	2–¼ x 3	236	310	4.00	3.70
2500	4–¼ x 3	2–¼ x 4	348	390	3.38	3.50
3000	4–¼ x 4	2–¼ x 5	431	484	3.00	3.54

What Does the User Say?

Monarch Machine Tool Company installed a busway system with aluminum conductors in its new Sidney, Ohio, plant. We asked Plant Engineer C. R. Wheeler what he thought of it. Here's the answer he gave us.

"We had no particular preference for aluminum over copper. In fact, our original order called for standard copper duct. But we could get so much better delivery on aluminum duct that we accepted it—as an expedient only.

"No change in price was involved. The cost of aluminum was the same for copper.

"All of our bus duct prior to our recent expansion was copper. This has been our first experience with aluminum.

"We have had no trouble with the duct in any way. No electrolytic action has been experienced. Inasmuch as the contact surfaces all along the bus bars are silver plated and the contact clips that make contact with the bus bars are also silver plated, no trouble should exist from oxidation.

"We found some advantages in using aluminum over copper. These are:

"1. Less voltage drop per foot of run.

"2 Lower temperature rise characteristics at full load.

"3. Less weight on supporting structures.

"4. More current can be carried farther at comparable power factor than with copper.

"The one disadvantage that we encountered was that the aluminum duct is larger for comparable ratings than copper. To be specific, the 600-amp. duct that we used had the same physical housing size as 800-amp. duct would have in copper. This means trouble where space to hang the duct is is limited.

"The installation offered no problem. We used the manufacturer's fittings, elbows, crosses, etc. We even made up special fittings where it was necessary to alter the original engineering. This necessitated doing some welding of the bus bars. We could stand a little more experience in welding the aluminum bars, but in general we welded aluminum successfully where necessary and have had no trouble with any of our welds."

Mr. Wheeler's experiences are with a specific size of busway made by a manufacturer whose product is based on the equalization of current-carrying capacity between aluminum and copper. Physical size became a secondary issue. The chart above gives a comparison of size, weight, and voltage drop when ampere rating is the same.

Other manufacturers have de-rated their products, using the difference in current-carrying capacity between copper and aluminum but the same size of conduction in each metal. When buying aluminum conductors, it is well to check ratings and find out how this rating is calculated.

PROSPERITY IN THE USA: How Wealthy Are We?

Again, how prosperous *are* the people of the United States?

This is the third of a series of messages devoted to this crucially important and much-debated question. The first two messages dealt with what has been happening to our national income, both in terms of its growth and how it is divided among individuals.

This third message deals with what has been happening to the resources—factories, farms, mines, and equipment of all kinds—out of which income is created. It deals with what economists call our wealth.

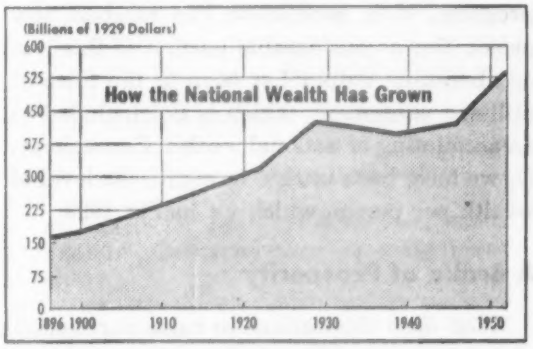
It is possible for a nation to enjoy apparent prosperity for a time by rapidly exhausting its resources. But to sustain prosperity over the long pull a nation must see that its wealth is not dissipated. Hence what is happening to our wealth now is a harbinger of what is going to happen to our prosperity later on.

How Wealth is Measured

It is often asserted that the most vital element in a nation's wealth is its people. There is a lot in this idea. For example, the full value of a country's hospital and surgical equipment depends on its physicians and their skill in handling the equipment.

However, no one has ever devised a satisfactory way to put a value on human beings. So people are omitted from calculations of national wealth. So, too, is military equipment. It is regarded as basically destructive and hence not a real addition to wealth. Otherwise, the wealth of a nation is calculated in terms of the dollar value of its physical resources.

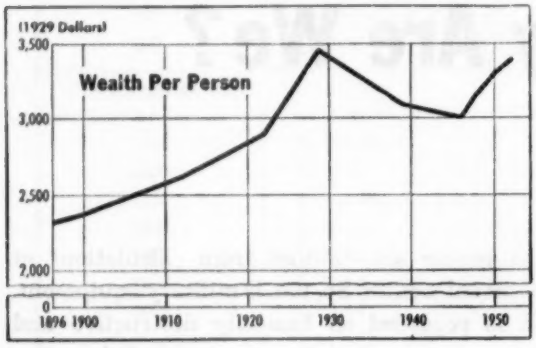
The following chart shows the wealth of the U.S.A. at various intervals during the past 50 years. For the period through 1948 the figures come from a pioneering study by Raymond Goldsmith of the National Bureau of Economic Research, which is widely regarded as the foremost organization in its field. The figures since 1948 are estimated. To remove the effect of price changes, all of the wealth figures are calculated in 1929 prices.



From this chart one fact stands out clearly. It is that since 1929 our national wealth has not been increasing as steadily as it did during

earlier periods. Indeed, in 1946 our total national wealth was actually less than it was in 1929. Only in the last six years have we been able to make any consistent additions.

Even these gains are less impressive when the growth in our population is taken into account, as illustrated by the following chart.



This chart makes it clear that when the nation's wealth is divided by the population, we are slightly worse off per person today than we were in 1929. This is the case in spite of the large additions to our national wealth since 1946.

Depression and war are the two principal reasons we have made no progress in increasing our wealth per person since the 1920s. The depression brought mass unemployment and greatly reduced production which ruled out any increase in wealth. During World War II and again during the post-Korean mobilization program, U.S. production has reached new peaks. But a considerable portion of this record breaking output has been in the form of military equipment, which is not included in an accounting of national wealth. Consequently, we have been unable to regain the level of wealth per person which we had in 1929.

A Brake of Prosperity

What does this failure to raise our wealth per person mean? It means that we have fewer resources with which to create income for each individual. It means that we have made no progress in the crucial task of assuring future increases in prosperity.

As the second editorial in this series demonstrated, we have gone so far in equalizing individual incomes that "the possibilities of increasing the income of the rest of the people by 'soaking the rich' have largely disappeared." From now on the only promising way to increase our individual incomes is to increase our national earning power.

During the past four years it has taken about $3.60 of national wealth to yield $1 of income after taxes. This is a low figure for the wealth needed. Prior to World War II there were long periods when it took at least $5 of national wealth to produce $1 of national income. The experts in this field are by no means certain that it will not again take $5 rather than $3.60 of wealth to increase income by $1.

But let us assume that $3.60 of wealth will suffice to provide $1 of income in the years ahead. If by 1960—seven years from now—the income of the average American is to be increased from about $1490, where it stands at present, to $2000, we must add $310 billion to the national wealth. This is nearly three times as much as we have added to our wealth since the end of World War II, seven years ago.

Because we have made large additions to our productive equipment in recent years, fears are frequently expressed that we shall soon be plagued by an excess of such equipment. But the facts about our national wealth do not support this conclusion. They indicate that we still have ahead of us a tremendous job of increasing our resources if the American standard of living is again to resume the steady climb which was interrupted by depression and war.

McGraw-Hill Publishing Company, Inc.

How Silicones Are Licking Some Tough Electrical Problems

By WALTER RUPPRECHT • Superintendent, Electrical Department, and E. A. CROSBY • Foreman, Electrical Repair Shop, The Dow Chemical Company, Midland, Mich.

NINE YEARS OF EXPERIENCE with silicones has proved to us that silicones give us the protection we need for motors and other electrical equipment under tough operating conditions. So two years ago we swung to silicones in a big way.

There are plenty of tough spots in a chemical plant. Most of our processes are automatic and self-sustaining. Day after day, year after year, motors drive pumps and agitators, fans and blowers, continuously. Conditions are severe—high temperatures, corrosive fumes, moisture, deliberate overloading. Failure of a motor can mean loss of a production batch. And loss of a batch often costs more than a rewind job on the motor.

So our electrical equipment *has* to be dependable. And it has to be durable.

HOW WE STARTED • When we first began to use silicone insulation in 1943, it was experimental.

In those days silicone insulation was difficult to handle. It was rough and brittle, and not very resistant to abrasion. It tended to break off in pieces. Often the insulation wouldn't fit into the slots in the motor designed for plain enameled wire. So only extremely bad operations got the silicone treatment.

MAINTENANCE IS REDUCED • Our operating records began to show up some startling facts. Where motors with Class A insulation or plain enameled wire lasted a month before burning out, the same motors treated with silicones ("Class H" insulation) lasted 5 or 6 years under the same operating conditions. (In fact, one of them is still operating after 8 years of service. It must be the oldest productive Class H motor in the world.)

Soon silicones became easier to use. The manufacturers designed out most of the original application bugs. But silicones still played a minor role in our operations until a new factor came to light.

PRODUCTION TAKES NOTICE • In some of our operations severe overloads are inevitable. Now the production department learned that the overload margin on silicone (Class H) insulation was the same as permanently up-rating a motor's output as much as 50%.

In other words, by rewinding with silicones we could get 7½ horsepower out of a 5-hp. motor. For some time we had known that it was theoretically possible to get this increase in horsepower. In 1948 we put it into practice. Here are some of the ways we took advantage of this fact.

Silicones in Motor Windings

CASE 1 • In 1948, on a certain process, the production engineers estimated that production would be increased over a third if the 50- and 60-hp., 850-rpm. motors in use could be replaced with 75-hp., 1150-rpm. units. We needed 31 of them. But delivery of these new motors was uncertain at that time. And, in addition, some mechanical work would also be needed, such as new rails, brackets, and motor mounts.

We decided to try rewinding the motors with silicones to get the increased output. We took down a few motors at a time, sending them to an outside repair shop or to their manufacturers for rewinding. Within a year, 12 were back on their original mounts. No new mechanical fitting had been necessary for their conversion. But now, instead of 50 or 60 horsepower, they were delivering 75 to 90 horsepower continuously, with peak loads up to 105 horsepower.

We ran these motors for two years and watched them carefully. No trouble developed. So we rewound the other 19 motors.

Now for a little calculation on savings:

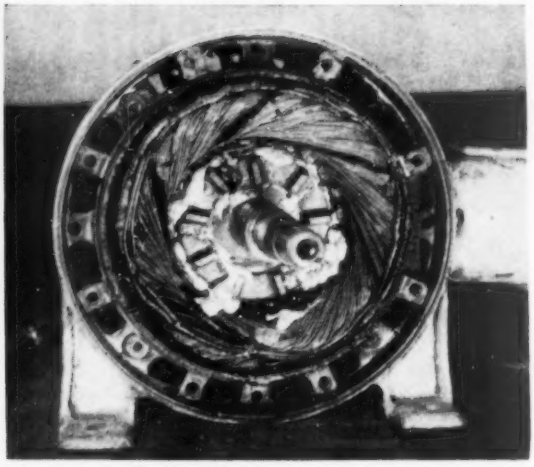
The cost of 31 new motors (if they had been available) with the new rails, brackets, and mounts would have been $64,580. The cost of rewinding our own motors for increased horsepower rating totaled $19,180. So our saving on the motors alone was $45,400.

But that wasn't all. Maintenance expense dropped, too. These motors are subject to extremely severe corrosive conditions. While motors with the old windings used to burn out at the rate of one a month, with silicone-treated windings only six have failed since 1948, and three of those failed because of bearing trouble.

Turn the page

Begins on page 113

THIS MOTOR HAS BEEN FLOODED several times. But it's silicone-treated and insulation shows no sign of breakdown. Dow Chemical rewinds all of its condensate pump motors with silicone.



ALUMINUM SQUIRREL CAGE MELTED and flowed onto windings when bearings froze and protective devices failed. But even this heat did not injure silicone-insulated windings.

CASE 2 • As part of the program of increased production in this same department, 22 oversized agitator pumps were installed. To drive these pumps we had to up-rate their 1750-rpm. motors 50%—from 2 horsepower to 3. We used silicone insulation. Cost of getting new motors of 3-hp. motor rating would have been $4400. Cost of rewinding was under $2300.

Maintenance costs dropped here, too. These motors formerly failed at the rate of one every two months. **In four years with the silicone windings we lost only one motor, and that was due to bearing trouble.**

CASE 3 • Probably our most persistent and irritating maintenance problem was that neglected pennypincher, the condensate pump. We have hundreds of them scattered throughout the plant, usually in out-of-the-way places. These motors return "used steam" to the boiler house.

The motors that drive them are in most cases close-coupled 3450-rpm. units, ranging in size from 1½ to 30 horsepower. Float switches start and stop them about four times an hour. Many operate under severe corrosive conditions. Some are in pits, where occasionally they are flooded. All of them are subject to moisture.

Failure of these motors not only resulted in maintenance costs for rewinding and replacement charges. The loss of condensate water that overflowed into the sewer ran as high as $40 a day.

For several years now we have been rewinding these condensate pump motors with silicone whenever they burned out on the job. There are only a few such motors left with Class A winding; they are in relatively well-traveled and well-protected locations. **Our electrical troubles with condensate pump motors have dropped to a minimum, so they are no longer a major item in maintenance costs.**

CASE 4 • Another trouble we occasionally run into with condensate pumps, besides dunking the motor with water, is the absence of water in the pump. When the float switch jams in a closed position, the pump runs dry and it builds up so much frictional heat that the motor bearings burn out. Then overload relays had better act quickly, or the windings will burn out, too.

Where overload relays fail, we had always considered the insulation on the winding as the weakest link in the motor—the first to give way. But look at the motor shown above. It got so hot the aluminum squirrel cage melted out of the rotor. **Yet, with all this heat, the silicone-insulated winding did not burn out. After we put in a new rotor the motor operated perfectly.**

CASE 5 • The high ambient temperatures in which many of our motors operate also gave us plenty of maintenance headaches. Take the two 5-hp. motors that cool the 800-hp. main blower motors in one of our powerhouses. Actually you cannot see them. The motors are inside the air ducts. All you see are the terminal boxes in the sides of the ducts (see photograph on page 115).

These motors used to fail about once a year when they were wound with Class A insulation. When either motor failed we had to shut down the cooling system and the blower motor, too, because we had to dismantle the ductwork in order to get the motor out. **Two years ago we rewound the motors with Class H winding. We haven't had any trouble since.**

CASE 6 • Ambient temperatures are even a greater problem with the 20-hp., 3600-rpm. fan motors on the heating oven. We have eight of these ovens in service (photograph on page 115).

Temperatures in which these fan motors operate

BLOWER MOTORS INSIDE AIR DUCTS (only terminal boxes show) operate at high ambient temperatures, used to fail every year. No trouble since rewinding with silicones two years ago.

HIGH TEMPERATURES AND OVERLOADS plague oven fan motors. But eight of them, rewound with silicones, have run without trouble for over a year. (They used to fail once a month.)

run up to 180F. But that isn't all. The ovens were designed for continuous operation. But when there's the slightest drop in gas pressure, the safety devices shut down the oven. The fan motors are fully loaded when the fans are handling hot air. Each time the ovens shut down and then restart, cold air overloads the fan motors from 50% to 200%. This happens about once a month, and almost every time it happened we lost a motor.

We rewound the motors with silicones. The last one was rewound over a year ago. Up to now, no motor failures have occurred.

CASE 7 • Fresh-water pump motors offer still another problem. We have about 40 brine wells feeding our plant. The vertical motors, rated 1½ to 5 horsepower, are protected from rain and snow to some extent, but not from the cold. In midwinter enough ice can form on the pump shaft to overload the motor and cause it to run at slow speed. When this happens, the motor usually burns out. During a long, severe cold spell, enough of these motors could burn out to leave a major part of the plant high and dry.

We started rewinding these motors too, with Class H silicone insulation. We have not lost a motor on this service since.

WHY NOT LARGER MOTORS? • It may be asked why we do not install larger motors on jobs like these to take care of overloads. One reason is that rewinding with silicones is generally cheaper. Also, space limitations often make it physically impossible to use larger motors.

But there is still another reason that rules out larger motors: Motors that are underloaded operate at poor power factor. To use larger motors to take care of temporary overloads would mean that these motors, when running on normal service, would be operating most of the time at 50% to 75% of full load.

Of the 17,000 motors in our plant, 8400 drive pumps, 4200 drive fans or blowers, and 850 are on agitators. It may be imagined what would happen to our power factor if the majority of these motors were operating at 75% load. On the other hand, rewinding with Class H silicone insulation is almost the equivalent of replacing, say, a 10-hp. motor with a 15-hp. motor—except that there is no change in power factor.

Of course, most of our motors are not subjected to the overload conditions, so Class A insulation is satisfactory. The condition of a burned-out motor when it comes into our repair shop usually tells us when to and when not to use silicones.

LUBRICATION IS IMPORTANT • There is one difficulty, however, in using silicone-treated motors. They must be properly lubricated with grease that is capable of resisting high operating temperatures.

Our lubrication department follows a definite schedule for motors, based on size and speeds. They use silicone grease for silicone motors. The only hitch is, they don't always know these special motors when they lubricate them. After all, the motors look the same, regardless of insulation.

For several years, therefore, we have used identifying colors. Silicone-insulated motors have a yellow band around the stator. Explosion-proof silicone motors are yellow with red end-bells.

The motors are painted all right when they leave our electrical shop. But often when a department or a piece of equipment is repainted, the motor is repainted, too—some other color. When that happens to a silicone motor, its bearings are in for trouble. Right now it looks like a special fitting to take only a special grease gun, filled with silicone grease, may do the trick. *Turn the page*

Begins on page 113

ALL BURNED UP in less than a month was the story with ordinary switchblade insulators. Silicone-glass laminate replacements (right) have been used two years, promise five years more.

PORCELAIN INSULATORS used to fail after water froze in cracks in cement holding metal inserts. Coating cement with a silicone resin stopped that. No failures in two years.

Special uses of silicones

Motors are not our only responsibility in the electrical department. We found uses for silicone products in other types of electrical equipment.

SWITCHBLADE INSULATORS • One 45,000-amp. traveling transformer, for instance, used to change its switchblade insulators into conductors in less than a month. Subjected to operating temperatures of from 400 to 500F., the cotton-phenolic disks and tubes never stopped shrinking. The switches were tightened daily; even so, enough heat was dissipated to reduce the insulators to little more than charcoal. Replacing them meant an entire day's downtime and lost production.

In November 1950, disks and tubes made of silicone-glass laminate were installed. They have been there ever since. When the unit was recently taken down for inspection, they still looked like new. They appear to be capable of providing another 5 years of service, at least.

PROTECTING PORCELAIN INSULATORS • Another use for silicone protection developed recently in our chlorine plant. Large blocks of power are carried from 10,000-amp. mercury-arc rectifiers to the chlorine cells through bus bars supported by post-type porcelain insulators.

Because of either temperature variation or chlorine corrosion, the cement holding the threaded metal inserts in many of these insulators developed cracks and crevices. In winter, naturally, rainwater or snow would enter these cracks, freeze, and break off pieces of porcelain—thereby exposing them to moisture penetration and eventual failure.

The problem was solved by brushing the insert cement joint with a heavy, air-drying silicone resin. Indifferent to temperature variations and the dilute hydrochloric acid formed by moisture and chlorine gas, the silicone coating has prevented insulator breakage for two years.

FIXTURE WIRE • Silastic-insulated lead wire is eliminating another difficult and expensive maintenance chore—the frequent replacement of lighting fixture wire. All our lighting circuits are carried in conduits, which double as stems for service lights. About half of these lights are on around the clock, and a large proportion are vapor-proof or explosion-proof. In this type, especially, retained heat builds up over a period of time until the entire fixture is so hot the fixture wire insulation chars, cracks, and burns out.

We've never had the manpower to be able to send out a crew to rewire just a single light. Service was delayed until several lights in a building had failed, although we well realized that operating safety and comfort suffered accordingly. Knowing that Silastic lead wire withstands 500F.—motor insulation baking temperature—we recently made it the standard fixture wire specification for every one of the 50,000 service lights in the plant.

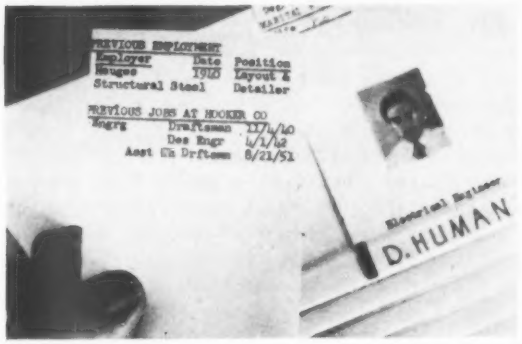
STILL ANOTHER APPLICATION • Our engineering department is considering the installation of silicone-insulated, dry-type, explosion-proof indoor transformers in many plant buildings. Simply by eliminating 110/220-volt distribution, such installations would simplify our maintenance work considerably. They would also eliminate heavy secondary conductors and help relieve our shortage of copper wire.

Plainly, silicone electrical insulation is here to stay at Dow. It has been greatly improved in the past few years, and will probably continue to be. It's true that most electric installations really don't need silicone insulation; especially when it costs about half again as much as ordinary insulation. But for the real hard workers—units which are unavoidably subject to excess heat, moisture, and overloading—silicone is the only logical choice.

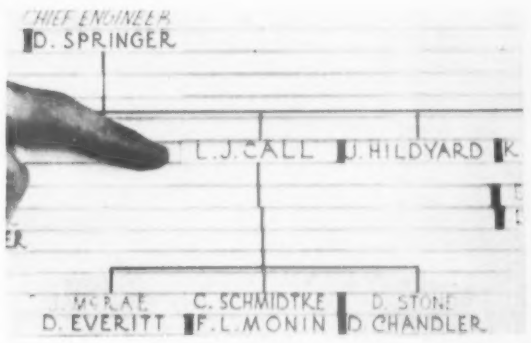
When up-rating motors for increased production, its cost, compared to new installations of equivalent output, is negligible. As a safety margin for severe service, it pays for itself many times over. To us it means time and money saved in the long run.

1. HOOKER EXECUTIVES MEET to choose successor to Chief Draftsman Mitchell, who is about to retire. They examine organization chart for engineering department—and...

2. THEY PICK OUT L. J. CALL'S CARD. He is assistant chief draftsman and first in line for promotion. Face of card shows photo, lists vital statistics, while . . .



3. BACK OF CALL'S CARD reveals previous employment record to "examining board," and—more important—lists previous jobs at Hooker. As a result . . .



4. CALL GETS THE CALL and—after he has been notified of his promotion—the card is inserted in its new position on the company organization chart.

Choosing the right man to promote is just a sample of how Hooker uses its

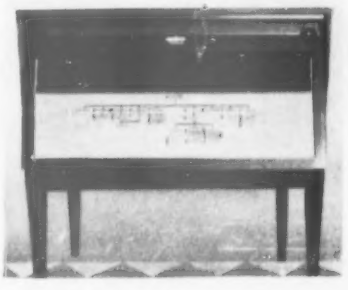
"Visible Index" Organization Chart

BIGGEST DRAWBACK of the usual organization chart is that it's just an outline. You have to go elsewhere for related information—especially about the *people* who fit the charted functions and jobs.

But at Hooker Electrochemical Company, Niagara, N. Y., they have no such "people problems" with their organization chart. The pictures on this page show why. With an ingenious visible index chart, Hooker simplifies its planning, and makes promoting, transferring, and training employees easier and more foolproof.

Charts are simple to maintain, too. Changes or additions can be made in a matter of moments.

The trick is to use narrow personnel record cards, with employees' pictures and condensed personnel records. Simply insert in extra-wide visible index files. When cards overlap, all you see is names, connected by chart lines. Hooker also uses colored tabs (black vertical lines in photos) as guides: green for technical men, blue for men retiring within 5 years, red for men retiring within 1 year.

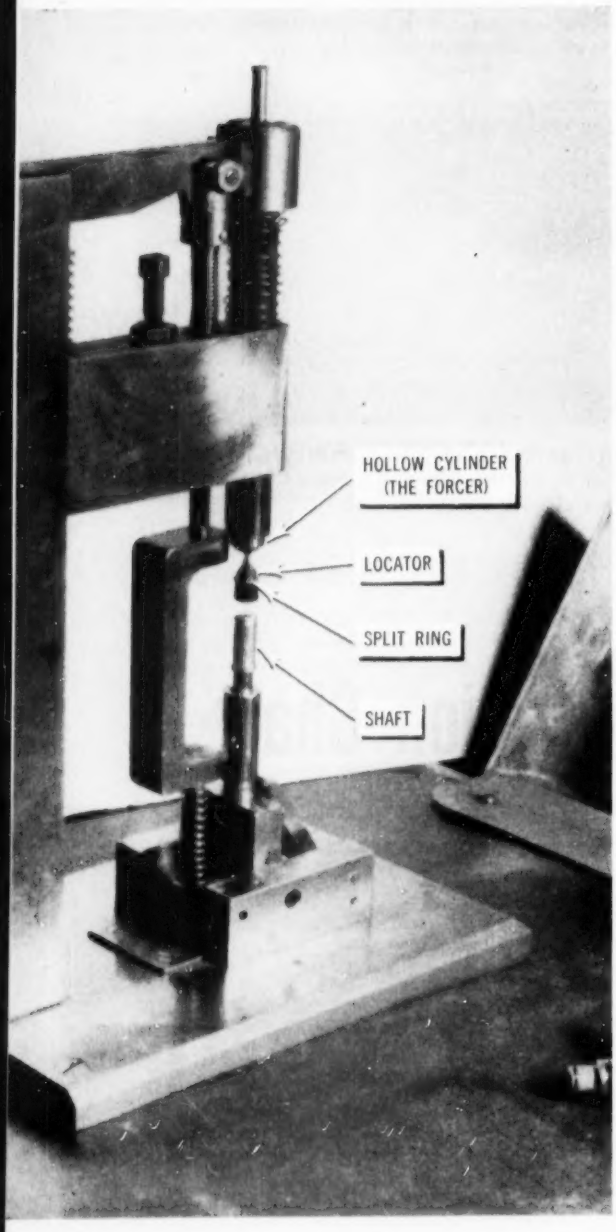


THE CABINET in which Hooker keeps its seven departmental organization charts ready for quick reference.

CASES IN METHODS IMPROVEMENT

MICRO · a division of MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
FREEPORT, ILL.

Big Ideas From a Maker of Little Things



What's *your* product? Heavy-duty lathes, air compressors, rectifiers? Something so big you can't borrow ideas from a company like Micro that makes tiny switches?

Forget it. Size of product has nothing to do with idea transference. And that process works both ways. One Micro method, for instance, was borrowed from a foundry. Another from an auto plant.

Which explains why Western Editor Walt Wagner picked eight of Micro's methods improvements for you to look at. Our guess: Inside of the next 6 minutes (reading time for the balance of this article) you'll be saying, "That gives *me* an idea."

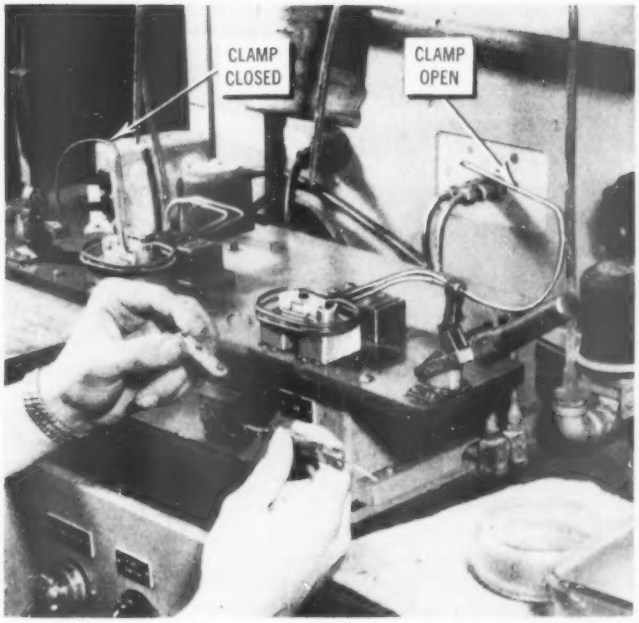
1. Assembling 360-deg. split ring to groove in shaft

OLD WAY · Shaft held upright in fixture. One side of ring placed in circular groove on shaft. Other side forced over top of shaft and into groove with hand tool similar to tang of file.

NEW WAY · Shaft held upright in fixture. Ring placed over tapered locator (this is possible because top of locator is cut away to thin web; bottom of locator has same diameter as shaft). When operator presses foot pedal, locator descends and forms tapered extension of shaft; hollow cylinder moves down over locator and forces ring down into groove on shaft. When operator releases foot pedal, cylinder and locator retract. Fixture pivots, shooting ringed shaft into chute at right of picture.

BENEFITS · Rate of ring mounting increased from 250 to 590 units an hour. Spoilage reduced—old hand method damaged many rings by stretching their elastic limit as they were forced over shafts.

MICRO SAYS · This tool makes ring fitting easy, appears to be workable in any size. How about trying the same method for replacing cotter pins and nut-and-washer assemblies? Or for using rings as end bearings in light-duty applications?



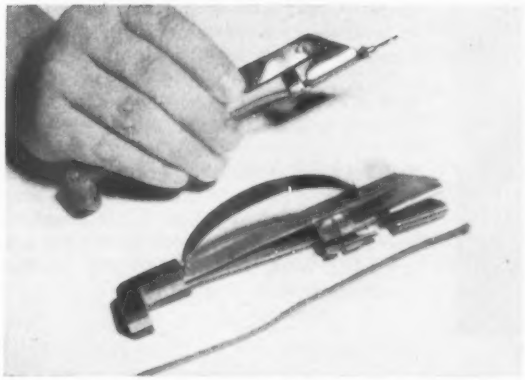
2. Soldering base to cover of hermetically sealed switch case

OLD WAY • Always done "new way." Could have been done with soldering iron or torch.

NEW WAY • Two pre-formed pieces of solder—forming oval same size as inside of case—are put in case and fluxed with small brush. Case is clamped in fixture surrounded by high-frequency coil. Coil is energized, then shuts off automatically after set heating cycle. Two set-ups permit loading one while the other solders.

BENEFITS • Speed and better quality. New method solders 180 units an hour. Top estimate for hand soldering was 99.

MICRO SAYS • Idea came from foundry — steel-making in high-frequency furnace.



3. Stripping soft insulation from flexible stranded wire

OLD WAY • Cut around insulation with razor blade. Slit insulation from circular cut to end. Pull off insulation with fingers.

NEW WAY • Special tool compresses insulation, exposing bare wire. Rear jaw of tool grasps wire and insulation, 1½ inches from end. Front jaw, near end of wire, holds insulation only. Pressure on spring handle moves rear jaw forward. Insulation is held back by front jaw, wire is pushed beyond it ½ inch.

BENEFITS • Ups stripping speed from 120 to 300 pieces an hour. Eliminates chance of cutting wire.

MICRO SAYS • Tool is adapted from stripper for solid wire with hard insulation. Could be used to strip soft braided insulation off any wire.

4. Winding stranded wire around terminal pin

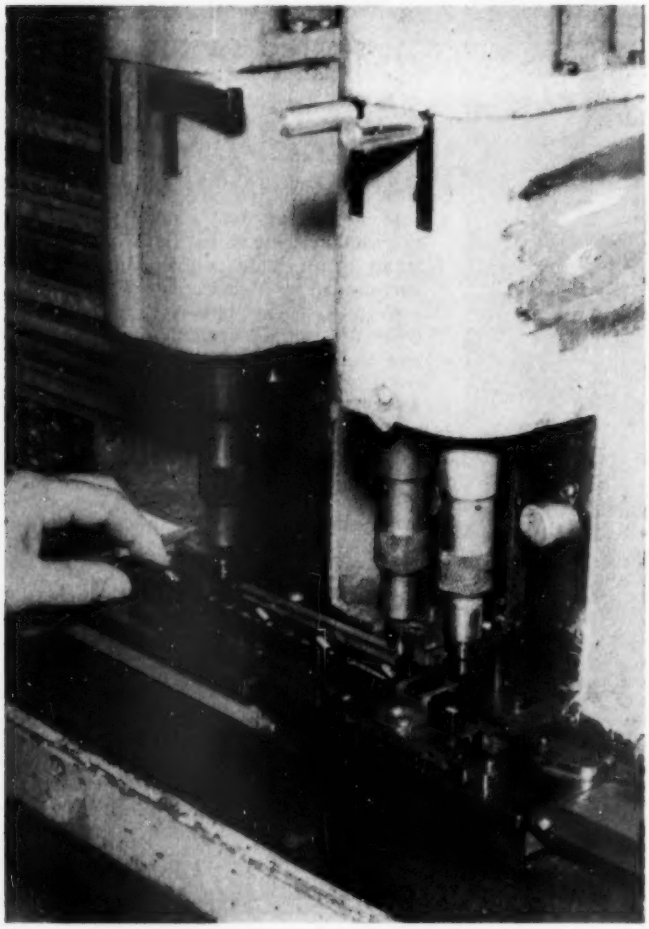
OLD WAY • Hold switch in left hand. Wind bare end of wire around terminal pin with fingers of right.

NEW WAY • Fixture holds switch. Operator lays stripped end of wire across top of pin with left hand, holds winding tool in right. Hollow end of tool fits over pin. Operator twirls tool in fingers, and hook on tool snags wire, winds it tightly around pin. When wire is all wound, tool spins free, is slipped off pin. This operation follows strippping of wire (left).

BENEFITS • Operator winds 800 pins an hour. With old method, nimble operator couldn't top 500.

MICRO SAYS • Production rate could be pushed to 1500 by motorizing winding tool and pushing pin into tool.

Turn the page



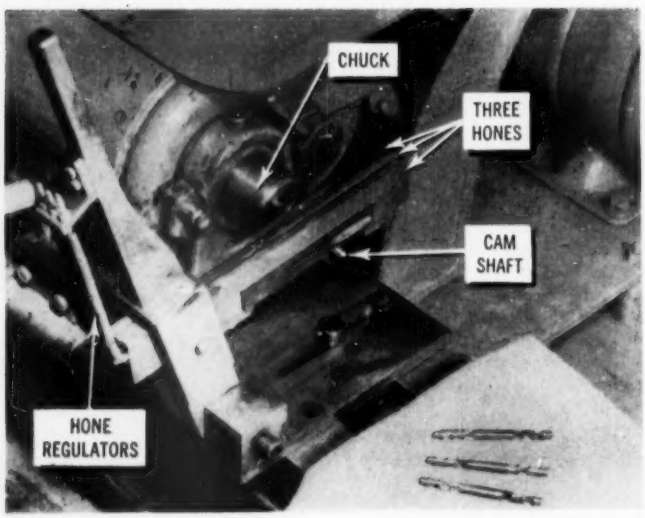
5. Running down three assembly screws

OLD WAY • Start screw in switch assembly with fingers. Run down screw with screwdriver. Repeat twice.

NEW WAY • Three screws are driven simultaneously by gang screwdriver. When plastic switch cases are molded, each tapped hole is counterbored deep enough so screw dropped in hole will stand upright. Operator drops in screws, pushes assembly into trough running under gang screwdriver. Note that one screw is driven at first station, two at next. This was necessary because of mechanical difficulty of building a single unit with blades so close together. Stop locates assembly under screwdriver, and finder on each blade centers screw if it isn't exactly upright. Foot pedal lowers blades and drives in three screws. Pushing new assembly into trough advances each assembly one place.

BENEFITS • Boosts hourly output from 450 to 1500 switch assemblies.

MICRO SAYS • Counterboring top half of tapped hole makes it unnecessary to start screws by hand. Why not use this method for assembling two pieces with nuts and bolts—or even for gang-nailing wooden assemblies, such as furniture?



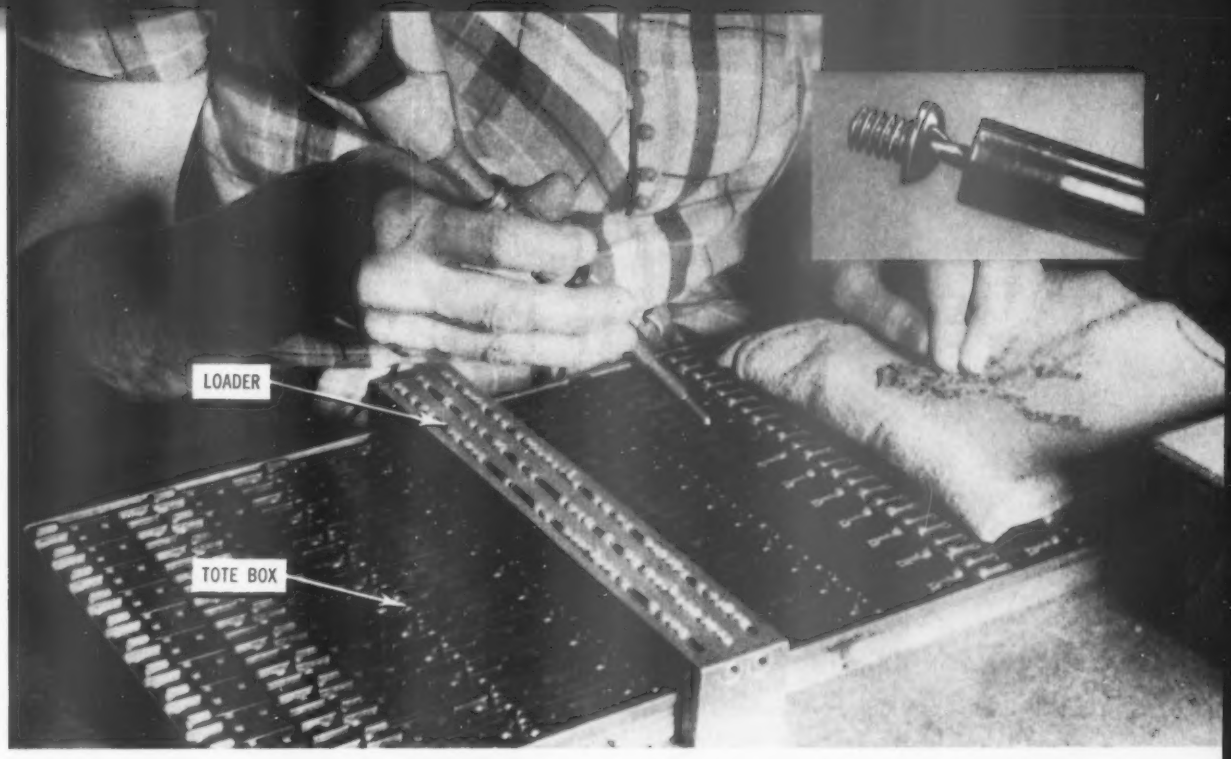
6. Honing tiny camshafts

OLD WAY • Hand honing.

NEW WAY • Camshaft is held in chuck and rotated. Stop in chuck positions shaft. Three hones rest on cam faces, ride up and down as shaft rotates, and hone all sides.

BENEFITS • Increases honing speed from 10 to 40 shafts an hour. Force of hones is uniform, giving better finish than was possible with hand work.

MICRO SAYS • This method was adapted from the superfinishing of camshafts for automobiles. It could replace hand honing of any size shaft, cam, cam follower, or other part that can be rotated.



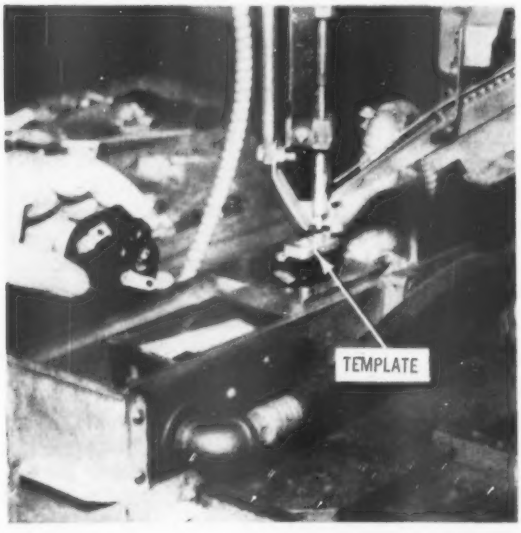
7. Picking up small screw and running it down

OLD WAY • Pick screw out of tote box and start it in switch assembly with fingers. Run it down with ratchet screwdriver.

NEW WAY • Put loader in tote pan of screws. Pile screws on loader. Shake loader over pan so that screws fall into loader slots with shanks down and heads up. Place loader over tray of parts. Pick up screw with screwdriver. Run screw into part. Twist screwdriver to break its hold on screw. Screwdriver has special head—tapered pin designed to jam into slot in screw (see insert). Finder on screwdriver centers pin in slot. Though screw can't be driven as tight with tapered pin as with conventional blade, it's driven tight enough for this operation.

BENEFITS • Raises assembly speed from 375 to 975 units an hour.

MICRO SAYS • Loader and special screwdriver would be workable in larger sizes for much larger screws. Should be useful throughout industry.



8. Screw-assembling two flats

OLD WAY • Drill and tap holes in two thin pieces forming assembly. Start screws with fingers. Run down with electric screwdriver.

NEW WAY • Drill holes in assembly. Over assembly, place template with holes corresponding to drilled holes. Drop self-tapping screws into holes. Template holds screws upright, with points resting in tops of drilled holes. Template is slightly thicker than length of screws. Template holes are slightly larger than screw heads. There's no need to juggle electric screwdriver to start screws straight.

BENEFITS • Jumps hourly output from 140 to 500 screws. Eliminates expense of tapping.

MICRO SAYS • This method is used for pieces so thin that counterboring hole isn't possible.

To Tickle Your Imagination...

. . . Associate Editor Carroll W. Boyce brings you advance notice of unusual and exciting developments. Our guess is, there's at least one you'll want to start thinking about today—perhaps doing something about tomorrow.

Balloons for Building

Glass balloons 0.02 inch in diameter seem to offer possibilities as a kind of "alloy" agent. That term isn't really accurate, but it approaches the general idea involved in a new material announced by the Armour Research Foundation and Kanium Corporation, Chicago.

So far, Armour and Kanium are thinking of their new product as a "building material." But it's too new for anyone to be sure just what uses it may have. Concrete mixes made with it (under the trade name Kanamite) are very fluid, can actually be pumped through rubber hoses to fill forms.

The balloons are made by dropping grains of clay through a tall furnace where they expand as they fall. Armour suggests it might be used in plaster, mortar mixes, or as a filler in plastics.

What else you might do with it, we haven't the faintest idea. But 15 years ago, "bouncing putty" looked like a parlor toy. Today we call it by its right name—silicone—and look at all the jobs it's doing!

A Really New Bonding Agent

Anaerobic permafil is a completely "different" bonding agent. It solidifies in the absence of air. That's important property No. 1. Property No. 2 is its tremendous ability to penetrate and seal tiny pores in metal—without pressure.

When General Electric first produced laboratory quantities of anaerobic permafil, there was one horrible drawback. As soon as you put it in a container, all the material below the top surface solidified.

Happily, the maker has now overcome this problem. By "holding back" one essential step in the manufacturing process, you can transport two compounds for later mixing. Once this step is performed (by the user), you then have true anaerobic permafil. And from then on you have to aerate it constantly until used.

Anaerobic permafil is not available at the corner drugstore, and it won't be available anywhere else in commercial quantities for at least some months to come. It is still far too expensive to produce except in the smallest laboratory quantities. But G-E expects to lick this "little detail" before the year is out. We will let you know the minute G-E can make any available for sale.

As for possible commercial applications in which cost of anaerobic permafil might be justified, best bet seems to be bonding two smooth metallic surfaces. The smoother the surfaces, the less air you get between them when you join them. That's the ideal condition for solidifying anaerobic permafil—and just about the worst for most "normal" bonding agents that need air to "dry" and solidify.

G-E makes no specific claims for the stuff. But from what we've heard, it has a very high tensile strength, stands up reasonably well under torsion.

Prelude to Ultrasonics

Next month I'll have a whole article for you on ultrasonics. Meanwhile, here's an item that points up an interesting and dramatic possibility.

One of the limiting factors in precision metal turning is the jerkiness of the tool carriage as it moves along the tool bed. That's because the carriage doesn't actually move continuously. Friction doesn't let it. And two kinds of friction get involved.

To start the carriage moving, you have to put enough pressure behind it to overcome static friction. OK, but once it starts moving, the only resistance to the push is sliding friction—and sliding friction is less than static friction. So the carriage tends to move too far. That means bringing it to a stop and starting this jerky cycle over

again. On a good tool, this jerking is too slight to be noticeable to the naked eye. But it's a real problem to the machine trying to hold a tolerance of half a thousandth or less.

So this is where ultrasonics comes in. Technically, you need a magnetostrictive transducer—but for the present let's skip the details and simply say an ultrasonic vibrator that produces sound waves at a frequency of about 25,000 cycles per second.

By hooking that vibrator to the tool bed (actually, there's no direct contact), you can make the sound waves wiggle the bed ever so slightly. But the energy that gets through to the bed is enough to shake loose the particles of dust and dirt and grease that cause the static friction to be so much greater than the sliding friction. You can't quite equalize the two, but you can come a lot closer than ever before.

The result is smoother tool travel and considerably greater precision than before.

It's still entirely experimental and neither the machine tool builder nor the ultrasonics manufacturer involved wants to be identified. Probable cost: $5000 for the vibrator and accessories, another $1000 or more for the installation.

Subs for Carboys

Nitric and sulphuric acids are now being shipped around the country in steel drums—on an experimental basis.

It's being done as part of a field-test program after several years of laboratory research that has led to an acid-proof plastic liner for the drums. The idea was to find an unbreakable substitute for the traditional carboys. No matter how carefully a carboy is packaged, breakage is still possible. And, obviously, there's grave personnel risk as well as certain damage to merchandise and the transporting vehicle whenever concentrated acid gets loose.

So far, reports of both field and laboratory tests are very favorable. We're told there's a "better than fair" chance the development will become generally available in 1953.

Progress in Electroforming

Here's a quick report on something that's ready now: electroforming. A handful of industries have been using it for some time. Steady improvements in electroforming technology make it essential for you to find out more about it if you have any possible applications in your plant.

Much research in electroforming was done by W. H. Safranek under the direction of C. L. Faust, head of the electrochemical engineering division of Battelle Memorial Institute, Columbia, Ohio—and the research is continuing there. So let's have them define it for you:

"Electroforming is essentially a process in which a thick layer of metal is electro-deposited on a mandrel or matrix which can later be removed, so that a self-supporting shell, sheet, or formed article is obtained."

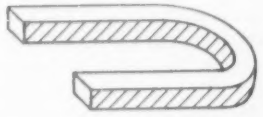
There are lots of ways of getting rid of the mandrel or matrix. The easiest, perhaps, is to make it of a plastic with a melting point substantially lower than the melting point of the metal being deposited. For many jobs, however, permanent or re-usable mandrels can be employed.

Three spots where electroforming is particularly useful are these:

1. Where you need irregularly shaped interior surfaces. To take an extreme case, you might want a pipe with walls like this in cross-section:

You simply make the outside dimensions of your matrix conform to the desired inside dimensions of pipe. After electroforming, melt out the matrix and you get the inside shape you want.

2. Where you want twists or turns in a hollow object. Radar waveguides are a prime example—and one of the most important applications of electroforming. The inside of a waveguide must be a precisely dimensioned rectangle, even when the wave guide turns a corner. Distortions created by bending a straight waveguide are not acceptable. But it's a cinch to make a precise mandrel (solid) like this, with a smooth finish:



When you finish electroforming and remove the mandrel, that's exactly the shape and dimensions you'll have *inside* the waveguide.

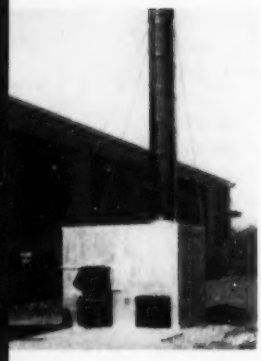
3. Where especially smooth interior surfaces are needed. Since the outside of the mandrel determines the inside of the finished piece, any degree of smoothness on the outside of the mandrel (relatively easy to control) will be duplicated on the inside of the electroformed article.

Among the materials currently being used for electroforming are iron, copper, nickel, brass, zinc, silver, lead, chromium, gold, and several alloys of those metals. By using special techniques, aluminum has now been added to that list.

One warning seems in order: Don't get the idea that electroforming is merely high-powered electroplating. It's more than that. And at the start, you'll need first-rate technical assistance to use it.

A good way to get more information is to read the paper presented by Faust and Safranek before the American Society of Tool Engineers. While the supply lasts, the public relations office at Battelle will be glad to send you a copy.

Burn 'em in an incinerator. For most plants, that's the...



Best Way to Dispose of Wastes

One of these new improved incinerators will pay off fast. And you'll . . .

- **Improve plant safety and community relations.**
- **Curb fire and disease hazards.**
- **Make your plant a tidier place to work in.**

BY KAY HESSELBERG • Chief Engineer, Brulé Incinerators, Chicago.

HOW'D YOU LIKE TO FORK OUT $60 a day to rid your plant of refuse? That's what a Chicago paint plant was paying scavengers to haul away barrels and cartons containing paint and asphalt residues.

Sounds steep, doesn't it? Evidently the plant engineer thought so. He took a second look at his waste disposal problem, decided to wipe out his high scavenger costs by investing $6000 in an incinerator.

His investment was sound. The incinerator paid for itself in about 100 operating days. It hasn't needed a bit of maintenance since it was installed in 1944.

An extreme example? Maybe. But it's far from isolated. And it points up the fact that incineration can mean dollar savings.

A smaller Chicago factory—a seat cover manufacturer—was spending $75 a month to dispose of such trash as papers, cartons, rags, and plastics. That expense was eliminated by $3300 incinerator. It paid for itself in less than 4 years.

Today many plants are incinerating wastes. They're finding that incineration pays off in better community relations, fewer fire hazards, less danger of disease, and improved plant safety and housekeeping. Most important to the hard-headed plant operator, incineration cuts the cost of waste disposal.

Wastes vary, of course, from industry to industry. They range from floor sweepings and oily rags to wood scraps and process residues. But most of them are paper and paper products.

What's the best way to dispose of your plant wastes? You can sell them, give them away, dump them, burn them in the open, or incinerate them. Chances are you'll favor the method that costs least in the long run.

Here are pro's and con's of each method:

SELLING WASTES • This requires ingenuity and real salesmanship. Some plants manage to sell wastes at a profit. Most are satisfied to break even. Salable materials are paper, cardboard, and wood scraps. Remember that paper must be sorted and baled, and that the market for it fluctuates. And don't make the mistake of the plant manager who found he was spending $3 to sell paper worth $1.

GIVING WASTES AWAY • Many plants give leftover wood to employees and neighbors, who use it for heating and home repairs. This type of disposal usually hinges on plant location.

One plant in a slum section had no trouble disposing of wood scraps. It simply dumped them on a street corner, where they were promptly grabbed by persons living in nearby buildings. But when the same plant moved to a suburban district, its give-away plan broke down. Neighbors not only passed up most of the wood but also objected to it as unsightly.

You're in luck if your plant wastes aren't worth salvaging but are worth recovery by an outsider. That's when the junkman becomes sort of an *ex-officio* member of your company. He'll charge you nothing to haul away rubbish. But he'll probably ask you to segregate some wastes before he picks them up. This runs into time, labor, and expense. And it runs into even more expense when you pay a scavenger to haul away rubbish.

DUMPING WASTES • Here's an easy, cheap method of waste disposal. But it's not always the best. Heaps of combustible material, for instance, are apt to catch fire — either spontaneously or through someone's carelessness.

Some plants take a dim view of piles of debris in their backyards. So they bury their wastes. This involves the added expense of digging a pit, packing down debris with a tractor, and covering it with a bulldozer. What's more, burying wastes makes it difficult to use the land for building. That's because the land settles as the waste decomposes. This decomposition often takes many years. In any museum, for example, you'll see large sections of

wood and cloth that were dug up in good condition after being buried for centuries.

Dumping wastes boils down to this: Few plants have enough property to dump on their own land. If they happen to be land-rich, they restrict their dumping to wastes that won't decompose and can be classified as fill.

BURNING WASTES • Here, too, land—or lack of it—enters the picture. If your plant is isolated or located on a large tract of land, you can burn wastes in the open. But you'll need a man at all times to control the fire and keep it going.

Trouble is, most plants aren't isolated and don't have "space to burn." So if they burn refuse in the open, they're on the receiving end of complaints about smoke, smells, ashes, and fire hazards. Fires of this kind have a habit of getting out of hand. The fire department of one Midwestern city answers as many alarms from the municipal dump as from all other blazes combined.

Incidentally, insurance companies aren't exactly oblivious to the dangers of open burning of wastes; they don't shrug it off in figuring rates.

Generally speaking, waste disposal has advanced beyond the point where the foreman tells one of his men: "Take it out back and burn it."

INCINERATING WASTES • Incinerators are, of course, non-productive. That's one reason why they're often relegated to the tag-end of a plant budget. Few plant operating men are keen about allotting large sums of money — plus space and labor — to non-productive equipment.

But the improved, modern incinerator needn't be an "also ran" in your budget. Its initial cost is low. Its annual maintenance costs are low — not more than 2½% of initial cost over a 20- to 30-year service life. It occupies little space, requires little labor.

In the latest furnaces, for example, you'll find big advantages over earlier models.

• Yesterday a tall stack, which boosted initial cost, was necessary to disperse and dilute combustion products. Today you can use a less expensive short stack. That's because the modern incinerator completes burning in the furnace proper instead of in the breeching and stack.

• Yesterday a damper was needed to control stack pull. And it wasn't easy to adjust the damper to avoid smoke, soot, and flying ash as the wind velocity changed. Today no damper is required. The furnace spins gases in secondary combustion areas — the harder the wind blows, the harder particles are spun out.

• Yesterday checkerwork, drift, and floating and hanging bridge walls made maintenance difficult. Today simple design eliminates these complications.

• Yesterday a double charging area was required to handle wet and dry wastes. Today wet and dry wastes can be charged in the same area, because inclined step grates improve the draft and keep the fire from smothering.

• Yesterday constant stoking and rolling over were necessary to create voids and speed burning. Today you rarely need to stoke charges and roll them over.

• Yesterday it was difficult to remove noncombustibles — cans, wires, straps, etc. — from the furnace. Today removal is easy. Noncombustibles are loaded through a front opening, gradually pushed to the back of the incinerator, and removed through an opening at the rear.

Incineration has a six-barreled pay-off. It:

1. Cuts down fire hazards. No more worries about dump fires, bonfires, and trash barrel fires. Stored wastes, always a fire source, disappear. The first fire prevented by incineration will probably more than pay for your incinerator.

2. Curbs disease. Flies, rats, and other vermin find the going tough when there are no waste piles to feed on. This reduces the danger of sickness among your employees and builds goodwill in your community.

3. Functions fast and without breaks. All combustible wastes are immediately consumed at one point. The small residue of ash — 1 part to 500 by volume and 1 part to 100 by weight — offers no serious disposal problem. Anything burnable goes. Charging is quick. Disposal is prompt. And it isn't necessary to stand around and watch the fire burn.

Rain or shine, incineration goes on. You don't depend on men or organizations outside plant control. Capacity is flexible—if a clean-up compaign boosts the load, you can use an extra shift or ask the night watchman to throw in rubbish. When the plant shuts down, the fire dies out of itself. A single match will start it again.

4. Improves housekeeping. An incinerator is, in effect, a bottomless bin. It handles wastes promptly so they don't pile up at collection sites and clutter up your plant. If your collection crew happens to skip a department, the departmental foreman can have one of his men take waste to the incinerator.

5. Saves space. An incinerator occupies only a fraction of the space usually used to store wastes. By speeding the flow of wastes, it also saves space at collection points in the plant.

6. Saves money. Incineration slashes labor costs by reducing waste-handling personnel. It lowers dump costs, scavenger costs, pit costs, and fire insurance premiums. In many cases, reduced scavenger costs pay for the incinerator in a few years.

Now that you've read this article, you may be thinking of building your own incinerator — or possibly, of experimenting with a cheap one. You'll be wise to think twice about those solutions.

Efficient incineration entails more than a furnace lined with firebrick and faced with masonry. Correct design and construction are key factors. If your incinerator is to do a job for you, it should be expertly engineered and designed to meet your special needs.

A timely survey reveals...

Important Facts About Time Study Men

If you have time study men in your plant, this summary of a recent survey should be right down your alley. It contains some pretty good ideas on what they do (and can do), where they come from, and what's needed to make them better.

HAVING TROUBLE finding good men for time study jobs? If so, you're in good company. Lots of plants are reporting this particular problem.

To see if he could come up with some clues to the problem's solution, Robert A. Jacobs, Purdue University, ran a survey of time study men in 25 companies. This is the story of what he discovered. It boils down to something like this:

Manpower shortages during the past decade have caused many companies to go outside the ranks of engineers for time study men. Result is that many of these men are in serious need of technical training. Three out of four survey replies put emphasis on this point. But —and this applies to trained engineers, too— there's also a big need for human relations training. Inability to get along well with people is the biggest single reason why time study men fail.

While they have been plagued by shortages of trained men, many companies have also asked their time study departments to take on additional responsibilities. The trend in the companies surveyed is to enlarge time study departments into full-statured industrial engineering departments. This, in turn, has meant that the job of picking the right men —and improving those on hand—has become tougher.

They need more training

Especially, say supervisors in the plants surveyed, in time study techniques, in human relations, and in selling.

KINDS OF TRAINING STILL NEEDED	PER CENT OF MENTIONS
Technical requirements	
Work simplification fundamentals	20%
Performance rating	20
Mathematics	12
Report writing	8
Development of standard data	8
Predetermined time standards system (Work-Factor, MTM, etc.)	8
Application of industrial engineering theory to practical problems	8
Machine feeds and speeds	8
Others (mentioned once each)	20
76% of the supervisors mentioned one or more factors.	
Human relations	
Human relations	24
Salesmanship	20
Personnel and union relations policies and practices	16
40% of the supervisors mentioned one or more factors.	
Operation experience	
Practical experience in type of work studied	28
Operator experience for general shop knowledge and psychology	12
32% of the supervisors mentioned one or both factors.	

It's not surprising to find 76% of the supervisors believe their men need more technical training. But note the large number—40%—that feel training in human relations and selling is needed. That's food for thought. And the fact that 32% want their time study men to have shop experience is a suggestion for selecting time study men—or training those you have.

A WORD ABOUT THE SURVEY • The 25 companies surveyed represent 7 manufacturing industries, including metal working, electrical equipment, food, rubber, wearing apparel, paper, and pharmaceuticals. The companies have a size range of 82 employees in the smallest to 15,000 in the largest. All but one plant have one or more unions representing the workers.

As you would expect, there are 11 different titles for the time study job in the 25 companies. Besides time study engineer, there are: methods man, industrial engineer, process engineer, manufacturing engineer, personnel director, plus 5 others that are variations of those named.

Their jobs are tougher

Queried on the duties and responsibilities of their time study personnel, here's what the 25 companies say they do:

DUTIES AND RESPONSIBILITIES OF TIME STUDY MEN	PER CENT OF MENTIONS
Analyze time studies and establish standards	100%
Make stopwatch time studies	96
Determine best methods for operations	84
Develop standard data charts	84
Analyze materials handling problems	80
Investigate instances of failing to make minimum standard production rates	80
Analyze equipment utilization	76
Conduct lengthy production check studies	76
Investigate cause of excessive down-time	76
Estimate labor costs of proposed new products	76
Lay out individual work areas	76
Develop machine capacity charts	72
Analyze direct labor advantages of equipment proposed for purchase	68
Assist in scheduling and machine loading	40
Maintain records of incentive performances	40
Assist in job evaluation program	36
Develop plant layouts	36
Assist grievance settlements where standards are involved	36
Analyze suggestion system proposals, calculate potential savings	12
Conduct supervisory training programs in time study and wage incentives	12
Conduct management surveys and organization studies	12
Develop production or process planning	12

How do the duties of your time study group compare with those of the 25 companies? Perhaps you're overlooking a function that your department could perform—one that would help make your plant a better-managed operation.

Some of them are misfits

Supervisors were asked to name the reasons why they had discharged or transferred employees of the time study department.

REASONS FOR DISMISSAL	PER CENT OF MENTIONS
Technical reasons	
Lack of thoroughness in preparing proposals	12%
Inability to analyze problems	8
Others (mentioned once each)	12
28% of the supervisors mentioned one or more factors.	
Human relations reasons	
Disregard for human relations fundamentals	44
Inability to sell operators and management	36
Loss of prestige with workers	8
Inability to deal with people and unions	8
72% of the supervisors mentioned one or more factors.	
Personal problems	
Emotional instability problems outside the job	20
Indifference to the job	16
Lack of originality, ambition, and common sense	12
48% of the supervisors mentioned one or more factors.	

Note that 72% of supervisors said they fired or transferred time study men for failure in human relations. Yet only 40% wanted more training in human relations. Note also that only 28% said they removed time study men for technical reasons, while 76% felt their men needed more technical training. These figures are not necessarily contradictory. They do indicate a sound basis for more human relations training.

Put this table and the one on the opposite page together for clues to better selection and better training of time study personnel.

Most of them have no engineering background

The 25 companies were asked for the prior experience of their time study men. Here, in the table, are the jobs they had worked at before. *Hint:* When you need time study men, look around other departments of your plant if you can't get qualified men elsewhere. Remember, too, when you need a man for a management position, there's a good chance he's in the time study department. That's one of the main reasons why this survey found only 12% of time study men with more than 10 years' experience.

WHERE TIME STUDY MEN CAME FROM	PER CENT*
Shop operating jobs	60%
Engineering jobs of various specialties	44
Clerical work in industry	36
Supervisory positions in shops and offices	24
Sales	20
Industrial relations	4
Others	4

**Adds up to more than 100% because most men had more than one job.*

Got Small Parts to Handle? Here's an Answer

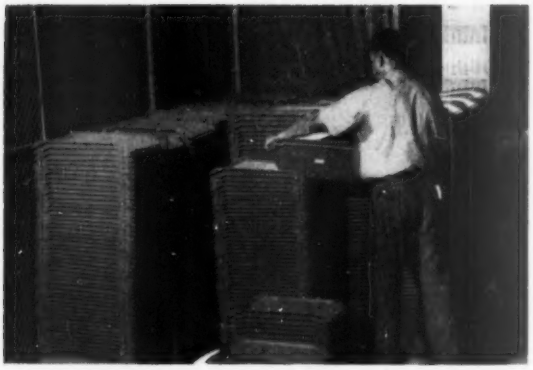
IT COMES from Chrysler. From the Michoud Ordnance Plant, New Orleans. Chrysler is using Nestier tote boxes—6000 of them. It found them the solution to the problem of handling small parts for the air-cooled engines it's building for the Army.

The special virtue of Nestiers is that they can be nested when empty, tiered when full. Empty Nestiers come into the receiving area on pallets. As purchased parts are received, they are sorted and placed in the Nestiers, then weighed. The loaded Nestiers then flow to the production area for storage and use. When the boxes are empty, they go back to the receiving department again.

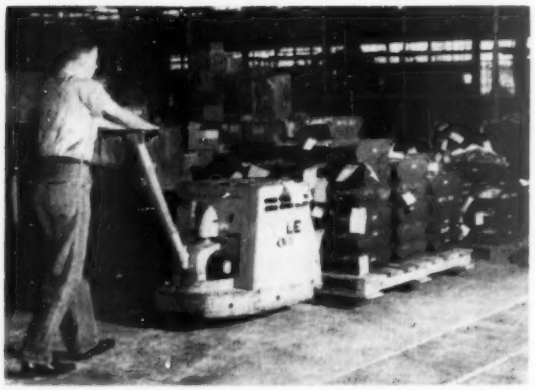
Results? Fewer parts lost. A continuous supply where and when needed.

The heavy-gage steel boxes stand constant handling without damage or breakage. They need no modifications, can be nested or stacked without added support, and can be used on pallets and shelves. They also ride roller or overhead conveyors, following equipment in process with additional parts as needed. A special hanger keeps the boxes level, even on inclines.

Chrysler has designed racks, assembly-line shelving, and inspection and reclaiming tables to fit both sizes. The tables reduce lost motion in handling by placing boxes at working height.



THEY NEST • That means a big saving in storage space at Michoud Ordnance Plant, New Orleans, where Chrysler Corporation is building air-cooled tank engines for the Army.



THEY TIER, TOO, so can be loaded on pallets and moved to storage area, for later distribution to assembly line.

SUBASSEMBLY BENCH at Michoud Ordnance Plant is especially designed to accommodate tiering toteboxes that solve

INBOUND PARTS are unloaded into Nestiers and weigh-counted in the production parts storeroom, then moved in the same container to production storage areas and machines. Boxes are open at both ends, so it's easy to spot-check contents.

problem of moving small plants through production and assembly.

NESTIERS FIT STANDARD SHELVING, double as more or less permanent bins for the storage of small quantities of small parts needed at assembly line.

Maintenance Stockroom Pays 8 Ways

Does it cost you a buck every time a maintenance man draws a washer from the central stockroom?

That's what Perfection Stove was paying—until it provided a maintenance stockroom, with low-cost procedures, right in the maintenance shop.

The result: a direct net savings of $25 per day in maintenance labor and material, plus better maintenance service to production departments.

By ARTHUR D. BUSCHMANN • Plant Engineer, Ivanhoe Plant, Perfection Stove Company, Cleveland

ONE ATTENDANT serves 40 craftsmen. No requisitions for items valued at less than $1, so paperwork has been halved.

CAN A MAINTENANCE DEPARTMENT with only 40 craftsmen support its own stockroom and tool crib?

If you have any doubts about it, here are eight reasons why we at Perfection Stove can answer a decided "yes." Our new stockroom has:

1. Eliminated 15 to 25 daily trips of 10 to 20 minutes each to the central stockroom.
2. Made possible a 100% re-use of good salvaged parts.
3. Provided control over spare-parts inventory.
4. Eliminated paperwork on requisitions for items valued at $1 or less.
5. Set up a firm follow-up on purchase orders.
6. Permitted a 50% increase in use of the department's small hand and power tools.
7. Reduced tool breakage and loss.
8. Cut downtime on production equipment.

When first proposed, the new stockroom and tool crib promised a tangible savings of $25 per day. On this basis it got quick approval by management. This prediction of savings turned out to be real, and with all the other advantages there are fewer gray hairs for the maintenance foreman.

Our stockroom isn't a space grabber—it's only 20 feet square. But it's large enough to stock all the needed supplies and tools. And it takes only one man to handle the crib and the many related functions that add to the efficiency of the maintenance operation.

Let's look in more detail at the eight reasons why our maintenance stockroom right in the maintenance shop is more than paying its way.

1. FEWER TRIPS TO THE STOCKROOM • Before maintenance had its own stockroom, a craftsman had to get a requisition from his supervisor, walk to the main stockroom (which was not always convenient in a plant 900 x 530 feet), draw the parts, and return to the job. The stockroom as now located in the maintenance department provides a convenient source for the more common supplies. Craftsmen come and go from the department throughout the day and can usually pick up wanted parts on these trips.

When men know in advance they need items not regularly carried in the maintenance crib, they

CENTRALIZED STORAGE of small tools and supplies has greatly reduced inventory from what it used to be when each craft had its own tools. Craftsmen often used to complain about tool shortages. Now they rarely have to wait for tools.

leave requisitions with the stockroom attendant. He then picks up these parts on his next scheduled trip to the main stockroom. In emergencies a craftsman may still have to go to the main stockroom. Generally, however, the crib attendant handles this job, freeing the skilled craftsmen for more important duties.

2. USE OF SALVAGED PARTS • In the average plant salvageable parts have a way of ending up in the scrap heap. Everyone would rather work with new material. Craftsmen don't have the time to disassemble and check all the piping, conduit, and miscellaneous equipment they remove.

This job of sorting and reconditioning makes a perfect "fill-in" job for our crib attendant. Also, it insures that the good salvaged parts will be reissued and used on a job. Our production department clears the disposal of surplus standard mill supply items through the maintenance department. Maintenance picks up these items and uses them, when possible. About one-third of the fittings in our crib have come to us via salvage or surplus.

3. IMPROVED SPARE-PARTS CONTROL • Like most maintenance departments, we require quite a few spare parts. Formerly, the more expensive items were kept in the main stockroom and requisitioned as needed. Smaller items, such as contact points, brushes, and springs, were kept by the craftsmen usually assigned to the repair work. Naturally there was duplication, confusion in reordering, and loss of small parts.

Now the crib man keeps these parts in bins, trays, or glass jars where it is easy to make an inventory. When supplies get low, he sees that the item is re-ordered.

We also have a section in the stockroom for critical replacement parts, motors, and so on. The crib man keeps a running inventory of these items to make sure we never run short.

Another saving comes from the salvage and planned storage of good parts from defective assemblies. Often these parts can be used or reworked to give additional service. The crib attendant is responsible for tagging and storing these parts, as well as spare motors, spare power trans-

mission parts, and other used but workable items. We now have an itemized, orderly storage of spare parts that saves time and money on every emergency call.

4. LESS PAPERWORK ON REQUISITIONS · Normal procedure in our plant requires a written and approved requisition on every item taken from the main stockroom. We found that the cost of processing the paperwork on many small items amounted to more than the value of the material.

Now the maintenance crib requisitions items valued at less than $1 from the main stockroom in lots and issues them to the craftsmen as needed —without a paper transaction. The crib attendant is responsible for keeping his stock at predetermined levels and for preparing requisitions on the main stockroom to replenish as required. This move has cut our requisition paperwork in half.

We charge the cost of material issued without requisitions directly to the maintenance department and distribute this cost to the factory as a part of the over-all burden.

Does this ease of getting small items mean more waste and loss? On the contrary, it means less. Because small items are now handy, there is less tendency for the craftsmen to double up on an order to save themselves a possible future trip.

5. FOLLOW-UP ON PURCHASE ORDERS · In our experience, purchase of urgently needed parts always requires follow-up. Usually it pays to follow up *all* materials or parts ordered.

We feel that the crib attendant is the logical man to handle this detail. He checks all items delivered to the maintenance shop and follows through on the paperwork. Space has been provided to accumulate parts for larger jobs. Then the attendant gives the word when all parts for a job are on hand.

The habit of follow-up pays off well. In time of normal supply it minimizes embarrassing shortages. In times of tight supply and uncertain deliveries, it results in an improved supply situation. And at all times it provides the information necessary for coordinated job planning.

6. INCREASED USE OF HAND TOOLS · Before we had a tool crib, each craft group kept small hand and power tools in its benches and trucks. Often a craftsman needing an electric drill or other tool would have to borrow it from one of the other craft groups—provided it wasn't in use. This practice led toward duplication of tools in each group, because everyone wanted to have commonly used equipment available at all times.

With the new crib, we are able to make all the department's tools available to any of the craftsmen without delay. We have had very few cases where all tools of a particular type were in use at one time. This used to be a frequent gripe.

We now require fewer of the smaller expendable tools, such as drills, files, etc., which the department furnishes. When a tool is broken or dull, the crib man gets it repaired or replaced.

7. LOWER TOOL COSTS · Under the new set-up, we consume fewer expendable tools such as drills, files, and saw blades. The reason: There's less temptation to overdraw, because the tools are more readily available.

All hand tools are now taken out on a tool check. This has reduced both loss and breakage. When men are held personally responsible for tools, they take better care of them.

Another element that helps keep tool costs down is the duty of the crib man to keep all tools in good condition.

8. LESS MACHINE DOWNTIME · Probably the most important effect of the maintenance crib is improved efficiency and less lost motion on repair jobs in the maintenance shop. When proper tools in good condition are readily available and spare parts or other materials are in stock, emergency and normal maintenance jobs move along at a faster clip and with less strain on the mechanics. This means less downtime on the production line and better and cheaper repairs. Serviceable tools and adequate supplies are the first line of defense of our maintenance department. Our maintenance stockroom justifies its existence by efficiently and effectively providing this service.

It'll pay you to look in the back of the magazine for...

...catalogs you can use on your job. FACTORY lists the most important ones received each month. ***Page 144.***

...equipment to make the job easier. A monthly trade show for plant operating men. ***Page 156.***

...hints on labor realtions. Not just for the labor relations man—for all plant operating executives. ***Page 218.***

...tips to help solve plant engineering problems. You'll find them on ***page 264.***

...and tips to help solve plant operating problems. Suggestions on methods and materials gleaned from current booklets. ***Page 268.***

...industrial news, hints, and quotes from business leaders. Begins on ***page 282.***

...reading to help you on the job. Here's a good guide to current books for the man who wants to get ahead. ***Page 338.***

...and others. For complete list, see table of contents, ***page 2.***

A TOBY QUINT EPISODE

Saving 1½% of Trouble

By RAY W. SHERMAN

TOBIAS QUINT, plant manager of Central Manufacturing, was hopping mad.

Ives J. Corke, superintendent of Production A, stared at the rug; Joel Bede of Production B worried a Chiclet; Eddie Lee of Personnel glared tight-lipped at a corner of the desk; Chuck Farr, industrial engineer, tried—but not too hard—to smother an I-told-you-so smile. It was a relief when the silence was shattered.

"Dag nab it!" Toby exploded, "we spend more darned time getting out of trouble we never should have got into!"

"I'm sorry," Corke ventured. "I thought I was saving trouble."

"Oh, I know." Toby leaned back and the group relaxed a bit. "Chuck Farr puts in a new power nut runner. What happens? Production goes up. Not much. Only 1½%. But it goes up. And the men make more money.

"So—I'll give you credit for good intentions, Ivy. You figured it wasn't much, and rather than change the incentive rate, you'd let the old rate ride and save argument.

"But, Ives—" Corke was always perturbed when Toby called him "Ives"—"the men didn't merit all of the 1½%. The company was entitled to part of it because it laid the cash on the line for the new machines."

"The men don't argue that point—much," said Corke. "Anyway, I'm sorry."

"The one little increase wouldn't have been so bad if it had stopped there," Toby went on. "But now in a new design the bolt is shorter and the nuts go on still faster. Up she goes another 1½%. Now it's up 3%. Trouble!"

Joel Bede kept worrying his gum and said nothing. It wasn't his baby. Farr knew he'd advised a rate change at the time but didn't want to rub it in. Lee kept silent. He could feel it coming.

"Eddie," said Toby, "I'm afraid I'll have to ask you to help us untangle this one."

"I'll try," Lee said. Why were they always handing the personnel man hot potatoes?

"We made a mistake." Toby was talking to Lee. "We should have made an adjustment when Farr put in the nut runner. But we didn't. That was a change in method. You know," Toby smiled, "you can say it better than I can."

Lee worked hard on a grin and finally made it.

"Now all of you!" Toby snapped to erectness. "Let's not let this happen again. This plant was started before some of you were born. It's been trying to *keep* out of—not *get* out of—trouble ever since.

"This incentive rate thing has been coming up for years. So we work out a formula. If a new method or design increases output by 1% or more, we make a rate change then and there. If we don't, the changes pile up till we *have* to make 'em. Then the men who have been enjoying the higher take-home for so long set up a howl."

"And how!" Corke sighed.

"Oh, well—" Toby shrugged and grinned "—I howled in my time. Nothing new about it. But," he asserted, "all you fellows have got to give the company credit for having reasons behind its rules. If you want to break a rule, OK. But let's talk it over first. Don't go busting rules on your own."

"Never again!" Corke solemnly swore.

TIPS TO GOOD HUMAN RELATIONS for factory executives

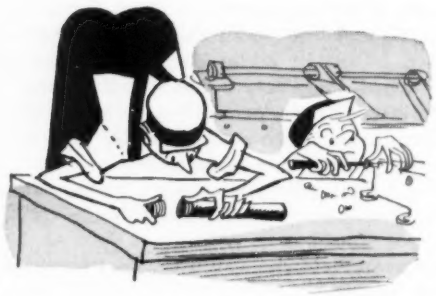
BY M. J. MURPHY • Industrial Relations Editor

HOW TO GET A FIRE DEPARTMENT Plant moves to the country are continuing apace. When they happen, the problem of adequate fire protection is often a big headache—and costly where you have to provide full facilities yourself. Here's one way out, developed by Chrysler in setting up its new Tank and Engine Plant outside New Orleans. Chrysler provided the fire truck, housed it in one of its buildings (fenced off so outsiders can have easy access). The city agreed to provide the firemen—and standby protection when the truck was out. The trick is that Chrysler agreed that the truck could be used to fight fires in the surrounding community area, besides being available for Chrysler fires. Chrysler saves money on the deal, and so does the city fire department. Local residents think it's a wonderful idea, since they get protection they never had before.

So everybody's happy—a real public-relations triple play!

INFLATION HITS EMPLOYEE RECRUITING Jack & Heintz, Inc., Cleveland, offers the most liberal awards we've seen for referrals of job applicants by present employees. Plan works like this: For every referred applicant who's hired and sticks for three months the referring employee gets a $25 Defense Bond. In addition, he gets another $25 bond if the applicant stays for six months.

Sounds high. But it's certainly a sure-fire incentive for producing a large volume of employee-referred applicants when labor's scarce. And, if you consider the high cost of other recruiting methods, it's not out of line. The plan also assures that the referring employee will probably exert his influence to keep his friend on the job over those critical first few months when most labor turnover takes place. That makes a lot of sense, too.

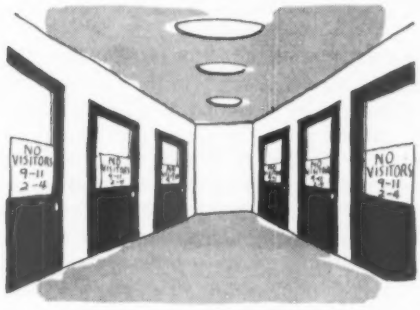


HEIGHT GAGE FOR BUILDING WORKBENCHES Trying to decide on the right height for a workbench can be like trying to decide how high is up. At least it seems that way if you've ever had to justify the height of your benches to a sawed-off worker or union steward. That's why the brief summary below may be of some help, if you run into the problem. The information comes from American Management Association's professional journal, *Personnel:*

An Iowa State College research project

checked the effects of six different workbench heights on the performance of 48 individuals who were doing a task that required manual dexterity. Bench heights ranged from an average of 25.9 inches to an average of 52.7 inches from the floor.

The best performance was recorded for an average height of 42 inches—or 3 inches below the worker's elbow.



TIME-SAVING TECHNIQUE

Here's a simple technique that supplements the article on page 84 in this issue ("You *Can* Use Your Time Better"). It was developed by a department head who faced this problem:

A group of half a dozen of his key men work right near him in a row of small offices. All do a considerable amount of creative work. They work closely together, and all began at about the same time to complain (more loudly than usual) about being "too busy." Investigation showed they were right. Main trouble was interruptions—of three kinds: phone calls, visitors from other departments or outside the plant, and visits among themselves.

Subtly nudged by their boss, here's what the group agreed to try:

1. They would see visitors promptly whenever they showed up. If tied up at the time, they gave their stenographers (one for each two men) a definite time of day for making return appointments.

2. They would limit their visits among themselves (a big source of interruptions) to the first hour of the morning, half an hour before and after lunch, and the last hour of the afternoon.

3. They would have all but urgent incoming phone calls handled on an "I'll have Mr. Jones call back" basis. Messages were delivered to their desks and they answered urgent calls at once. All others they answered during their "visiting hours."

How did it work? Very well for several months. They now have slipped, but are getting in trouble, and tightening up on the plan again. They think it's an ideally simple way to salvage work time that—for them, at least—was being needlessly wasted.

ONE CURE FOR TROUBLESOME 'RED-CIRCLE' RATES

The Associated Industries of Cleveland offers this information as one way to get around "red-circle" rates—rates in excess of maximum, most often paid to old-timers. Of course, it's easy to say "Don't do it." But what if you *have* to do *something*, you feel? Then you might consider doing what 11 companies surveyed by AIC do: Give some form of seniority bonus. Then the bonus acts as your recognition of long and faithful service—and it doesn't throw your basic wage structure into a tail spin.

Practices of the 11 compaines vary greatly. One gives $1000 for 25 years of service, another $500. At the other extreme, one company gives $5 for less than 5 years and adds $1 for each year over 5. AIC doesn't *recommend* the practice, but suggests the companies apparently feel it's preferable to red-circle rates.

WANTED: SUBSTITUTE FOR 'HANDICAPPED'

You don't have to visit many plants over the country to find they're doing a lot to provide jobs for so-called "handicapped" workers. Everywhere you go, though, you find this: *Those workers aren't handicapped for the jobs they're doing!* So why call them handicapped?

This may sound like merely playing with words. It isn't, though. "Handicapped" is just a poor label for many competent workers. It's bad in that it implies condescension and charity motives on your part that aren't there at all—and that certainly aren't in the minds of a "handicapped" worker's fellow employees.

What's a better label to use? Any of you readers have suggestions? If so, send 'em in. We'll do some reporting, and will try to start a move toward using a better label.

Beginning in 1948, the Anglo-American Council on Productivity, with the help of the Economic Cooperation Administration, has sent over some 70 British industrial teams to study American methods.

From Jan. 9 to Feb. 20, 1952, a team of 10 maintenance experts made a 4000-mile tour of U.S. industrial areas to study plant maintenance practices. It visited 16 plants that included aircraft, automobile, brewing, chemical, electronic, furniture, oil refining, papermaking, textile, and general engineering industries. It attended the Third Plant Maintenance Conference and Show.

The editors of FACTORY worked with these British specialists in New York in laying out this itinerary, and had several conferences with the team and individual members during their stay. So we can assure you from personal contact that their views are those of senior engineers—representing both management and labor—who know what they are talking about.

Purpose of the team's visit was to study technical administrative methods rather than engineering details of plant maintenance. This approach, it believed, would contribute most toward promoting greater efficiency in any plant or industry.

Now the team has compiled a 70-page report on its observations. This report is not just an account of American methods. It is a guide to plant maintenance, based on the best practice in both countries.

We recommend this report to all plant executives who are looking for ways to improve plant productivity. You can get a copy for 65 cents from the Office of Technical Services, Department of Commerce, Washington 25.

The report is already boiled down so well to essentials that no digest could do it justice. But, to give you a fast-reading idea of the nature and content of the report, we have extracted comments from some of its chapters. You may not agree 100% with everything the report says, but as an unbiased work it will sharpen your viewpoint on old and new maintenance practices.

A team of British specialists tells you...

What's Good – and

The part maintenance plays

A NEW VIEW OF MAINTENANCE IS NEEDED

"Production management (in the past) tended to regard maintenance as the friction in the wheels of industry rather than the lubricant which keeps them turning. Modern industry, however, recognizes the advantages to be gained by treating maintenance as an equal partner with production, and thereby raising maintenance to the status of a planned operation."

WHAT MAKES A GOOD PLANT ENGINEER?

"The difference between good and indifferent engineers is much less in the technical knowledge with which they start, than in the way they apply that knowledge in the light of experience. In no branch of the profession is this truer than in maintenance work."

LEST WE IN AMERICA GET A SUPERIORITY COMPLEX—

"In both Britain and the U.S.A. there is an increased appreciation of the part which maintenance can play in the furthering of production aims. This is greatest in the continuously operating industries to which the new methods make perhaps the greatest contribution, but is not confined to them. American progress is thought to be at a greater rate than is evident in Britain, but the standards actually achieved to date in the factories visited were lower than those in many comparable industries in the United Kingdom."

Maintenance group organization

STATUS OF PLANT ENGINEER

"The chief production executive (general manager or vice president) is the person to whom the works engineer (plant engineer) should be responsible."

"The works engineer may be defined as the chief executive for all work of an engineering nature relating to the capital assets of the firm. His duties are usually of an executive (administrative) nature with regard to maintenance and services, and functional (supervisory) with respect to design and construction."

Not So Good – About Maintenance Today

ORGANIZATION NOT STANDARDIZED

"It is not possible to standardize a maintenance group organization for all industries, as each type of plant requires different craftsmen to deal with the special requirements of the production . . ."

RESPONSIBILITY FOR MAINTENANCE STORES

"The question whether the engineering maintenance stores are in the custody of the purchasing department or the maintenance department is perhaps somewhat controversial. But the chemical, oil, and food plants in the U.S.A. appear to favor the latter system. The reason may be that the bulk of such stores material is used exclusively by the maintenance department . . .

"If a sub-stores is desirable, and indeed necessary for the economic operation of the maintenance section, it would be advisable for the engineer or foreman in charge of maintenance to be responsible for the control of such stores. It is the team's opinion that there are many advantages to be gained by the adoption of this method of control."

Maintenance planning

DOES IT ALWAYS PAY?

"Planned maintenance sets a standard which may be economically justified only in plants operating continuously at high rates of output. In these conditions experience indicates that it will reduce both maintenance and production costs and the incidence of emergencies."

"The main potential disadvantage is a tendency towards keeping in production that plant which is technically out of date, but which is in such good condition that there is hesitancy to spend money on known technical improvements."

DOES IT REALLY MEAN MORE PAPERWORK?

"In the plants visited in the U.S.A., the complexity of paperwork seemed to be greatest where attention to maintenance was most recent, but much less where an organization had settled down. Everywhere there was a very evident fear that better organization must involve more and more paperwork and consequent increase in overheads.

"This fear may well be exaggerated, much of it being attributable to the higher proportion of returns and records which achieve an official format, although they may actually *condense* information previously scattered. The existence of these official forms is merely more obvious."

MEASURING NEEDS AND PERFORMANCE

"Maintenance control suffers from the lack of any absolute basis of comparison and . . . readily determined performance indexes or ratios."

"If man-hours can be related to 'work units' having some absolute value which is at least consistent within a given factory, some much better measure of labor utilization can be obtained. Even this important step only takes the maintenance engineer part of the way, because in the major process industries (which operate continuously) machine and plant utilization is the more important factor. The engineer himself remains the best judge of the policy most likely to improve the availability of the plant, which is the first and fundamental step to its better utilization. Once that policy is clear he can more easily assess the most economic deployment of the labor required."

PREVENTIVE MAINTENANCE INSPECTIONS

"The economic period between examinations is presumably that which gives notice of incipient trouble without allowing it to develop."

"Any bias should be initially in the direction of too frequent inspection, as one premature failure will cost more than a number of unnecessary examinations. An examination period is too short if it continuously shows no change in condition."

Work study in maintenance

WHAT YOU CAN EXPECT FROM WORK STUDY

"The adoption of these techniques in the maintenance department should considerably facilitate the control of the maintenance labor force. A knowledge of the standard hours of work in maintenance jobs scheduled for performance in a future period would assist in the provision of the necessary labor. A comparison of the standard hours of maintenance work performed with the actual man-hours worked would provide a check on the labor utilization. In addition to these purely control functions, the work standards could also provide a basis for a system of incentive payments to the maintenance personnel." *Turn the page*

METHODS STUDY HAS ITS LIMITS

"In all the work, however, it is desirable that the study of methods shall be continued to a point where the benefits to be expected from further improvements would not justify the efforts needed to secure them. For work of a low degree of repetitiveness it will be difficult to justify the detailed examination of methods unless there is a possibility of adding appreciably to the utilization of production equipment by the resultant reduction of downtime."

Control costing for maintenance

SOME PREREQUISITES OF BUDGETARY CONTROL

"A costing system which will correspond with such a policy (of budgetary control) requires to be exceptionally flexible if it is to function at all levels, and will be particularly dependent on the original charging of costs and its accuracy."

"Attempts to apply average cost-of-living, or price-level index corrections to the more detailed sectional costs are doomed to failure, at least in general maintenance costing."

"Only the principle (of coding accounts) can be standardized. Its intelligent application to the problem of an individual factory or industry is a matter for the management of that factory or industry, and will not be achieved by any use of formulae."

HOW TO USE COST DATA TO MEASURE EFFICIENCY

"At all levels, comparison should be with estimate, not with previous costs."

"It is the *trend* in a particular plant which is of value. General standards cannot be set up except by engineer and manager jointly for their own immediate field."

"The ratio of labor cost to material cost is often a useful indication of the amount of material which an efficient workman can handle."

"The amount of capital value in plant which can be maintained per maintenance employee may be of significance, and can be expressed as total annual maintenance charge as a percentage of capital *corrected to current values.*"

"If estimates are prepared on the right lines, the best index of efficiency is the ratio which the actual costs bear to that estimate—not that they are below it, but that they are reasonably close to it."

Maintenance personnel

APPRENTICE TRAINING HERE AND IN BRITAIN

"Formal apprenticeships as known in Britain were not met with, and would seem to be uncommon in the U.S.A. This situation, coupled with the enormous expansion of American industry, has produced a lack of versatile craftsmen (in the U.S.A.) suitable for immediate assimilation into maintenance staffs.

"We feel that the development and increasing use of more expensive and complex plant renders more necessary than ever staffs of maintenance craftsmen with sound basic training in craft fundamentals, and where necessary, with a high degree of specialization in particular fields of activity.

"We see little reason to recommend any change in the methods extant in the U.K."

ONE WAY TO GET GOOD CRAFTSMEN

"It is our opinion that efficient organization and planning should enable maintenance work to be performed and manpower utilized, so that adequate payment of maintenance personnel . . . can be achieved without recourse to incentive payments or systematic overtime working."

Recommendations

. . . AS TO PURPOSE OF MAINTENANCE:

"That industries in the U.S.A. and U.K. should consider whether their present organization enables their maintenance staffs to make their full contribution to the formation of production policy."

. . . AS TO ORGANIZATION STRUCTURE:

"That the maintenance of both production plant and general engineering services, i.e., power and steam generation and distribution, should be the sole responsibility of the works engineer."

. . . AS TO MAINTENANCE PLANNING:

"That more consideration should be given to the application of method-study and work-measurement techniques to maintenance work."

. . . AS TO APPLICATION OF WORK STUDY:

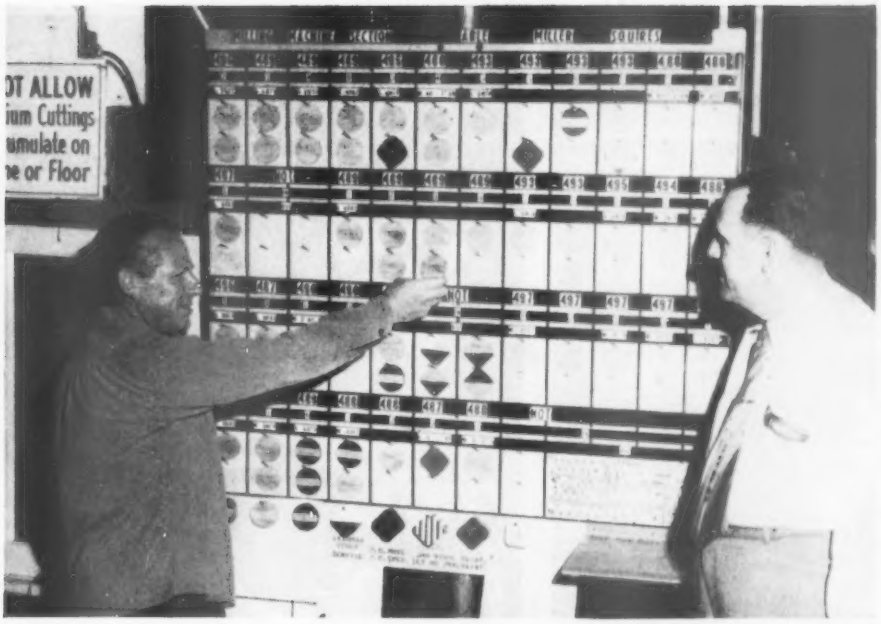
"That the labor utilization of maintenance departments should be ascertained by comparison against predetermined standards."

. . . AS TO CONTROL COSTING:

"That costs, appropriate to their responsibilty, should be made available to all employees carrying management authority for any phase of production."

. . . AS TO MAINTENANCE PERSONNEL:

"That all possible encouragement be given to all categories of staff to submit for the attention of management any ideas which have as their object the increasing of productivity, efficiency, or safety."



ALUMINUM TAGS in three shapes and a variety of colors show status of machines and orders on this easy-to-read production control board. There's a legend across the bottom of the board as a reminder, in case someone forgets the code.

This schedule board at Lockheed...

Saves 180 Machine-Hours a Month

A shop man's tool, designed and used by shop supervisors, helps cut downtime and boost output

THE MILLING SHOP of Lockheed Aircraft Corporation, Burbank, Calif., is saving 180 machine operating hours per month with a new production control board.

A foreman and a leadman designed the board to meet the specific production control problems of their shop.

Purpose of the board is to help the shop keep the machines in productive operation and avoid downtime. Variously shaped colored tags show for each machine: orders in process, orders scheduled ahead, and service needs (if any).

THE BOARD · The board lists each machine in the department by number and abbreviated description. Under each machine number are two hooks, one above the other, to hold status-revealing tags.

THE TAGS · The tags are 2½-inches in diameter or 2¼-inches square, made of scrap aluminum. Shape and coloring of a tag is the key to machine status, explained at the bottom of the board.

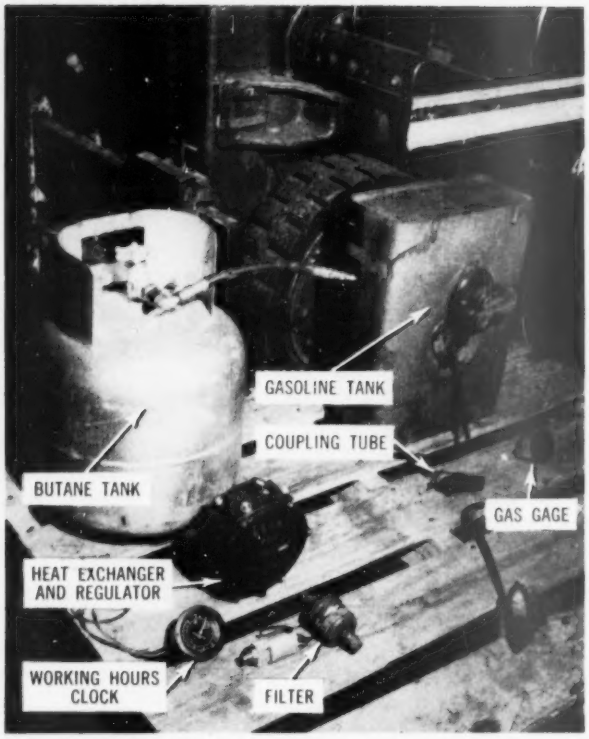
Round tag represents an order, shows part number and date due. Hung on the upper hook, it means an order in process; on the lower hook it shows the next order scheduled. Colored round tags indicate jobs ahead of schedule, rush orders, etc. When an order is completed, the tag is moved to the lower hook and a green diamond-shaped tag is hung over it to tell production control to move the parts and process the papers.

Square tag, aluminum colored, is hung on the lower hook to show why another order should not be scheduled immediately. "Long run" or other reason is penciled on the tag.

Diamond tags, variously colored, are hung on lower hooks to show the type of service required by machines. *For example:* Red-and-white striped tag means maintenance called for service; solid red shows machine is out for repairs; green-and-white striped tag tells production control to move order on round tag under it to the machine; blue-and-white stripes call for set-up; red-and-yellow combination means time standard is required; and so on.

Responsibility for maintaining the board is spelled out in a brief standard procedure. Except for a few board operations for which production control is responsible, shop supervisors place tags and use the board to help them run the shop.

CONVERTED TRUCK in action. Fuel tank at right of driver's right foot isn't in the way. When empty, it can be exchanged quickly and easily for a full tank.



TO CONVERT a fork truck from gasoline to liquefied petroleum gas (butane-propane) parts at left had only to be substituted for those at right.

Fuel switch to LP (Liquefied Petroleum) Gas...

Saves $300 per Fork Truck per Year

AFTER TRYING one fork lift truck converted to use butane-propane instead of gasoline fuel, Western Carloading Company, Los Angeles, converted its entire fleet. Now the company is planning to convert its stake delivery trucks, too. That's because it figures savings on the fork lift trucks are $300 per year per truck.

The savings are based on comparison of fuel, oil, and maintenance costs. In addition, the company reports elimination of unpleasant fumes, which saved the cost of installing air-circulating equipment.

The butane-propane combination fuel costs Western Carloading about half as much as gasoline. The comparative cost of gasoline and LP-gas depends largely on where it's purchased.

The company says it used to change oil in its gasoline-powered trucks every 48 operating hours because of sludge. Its experience with butane-propane fuel indicates that the oil-change period has been boosted to 700 operating hours.

Many of the trucks have been operating now for a year without requiring major overhaul. For one thing, it appears that engine corroding and oil-and-water acid emulsion, due to incomplete combustion, have been eliminated.

Conversion of a truck cost approximately $150 per unit.

The company maintains three fuel tanks for each fork lift truck. A tank holds sufficient fuel for 8 hours' operation. Empty tanks are replaced with full tanks quickly—it can be done in 6 seconds. Once or twice a week the empty tanks are refilled by a nearby distributor.

If you plan to convert...

Here's Good Advice from an L-P Gas Producer

To get you some further advice on conversion to LP (liquefied petroleum) gas, FACTORY asked William H. Kramer, Jr., District Manager, Sales Department, Phillips Petroleum Company, New York, a producer of LP-gas. Here's a summary of his comments:

1. The best method for changeover of an engine is to have the engine manufacturer supply the engine equipped to burn propane. If the engine manufacturer cannot supply a fully equipped engine, he can advise how to convert the engine, and the truck manufacturer or a trained mechanic should make the conversion. The insurance carrier and local regulatory bodies should approve the installation. Also let your LP-gas supplier help you.

2. Because LP-gas requires pressure storage and special handling techniques, its use for industrial trucks will be of greater interest to plants now using LP-gas for other purposes. Here, it is a simple job to add a liquid transfer pump, meter, hose, and fueling nozzle to the present piping to refuel trucks.

The cost of adding this equipment will vary with each plant, depending on piping layout, location, and number of trucks to be filled. The pump, complete with auxiliaries, would cost approximately $1000.

For a tryout period, you can use a small hand pump, costing a little more than $50.

Storage and handling equipment installed at a plant not now using LP-gas would cost approximately 60¢ to 90¢ per gross gallon of storage.

3. The LP-gas industry has a set of standards for the "Storage and Handling of Liquefied Petroleum Gases" (Pamphlet No. 58, published by the National Fire Protection Association).

Industrial trucks are not specifically covered in Pamphlet No. 58, but the general rules apply. Because the application of LP-gas to industrial trucks is new, it will be some time before specific rules can be set up. However, the insurance carrier for the particular plant should approve its use. Also, any local regulatory bodies having jurisdiction should approve it.

It appears that these approvals will be given:

a. If storage and handling of LP-gas is in accordance with Pamphlet No. 58, regulatory bodies having jurisdiction, and the insurance carrier.

b. If truck fuel container is in a safe location.

c. If trucks are fueled at least 50 feet away from any important building.

d. If vehicles are stored and serviced in a safe location, preferably a separate room, mechanically ventilated.

e. If an automatic shutoff valve is installed in the liquid line to cut off the fuel if the engine stalls.

f. If the conversion of the LP-gas fuel system is engineered by the manufacturer, a competent engineer, or a qualified parts supplier.

g. If the fuel system and installation is approved by Underwriters Laboratories or a recognized testing laboratory.

The use of LP-gas in the New York metropolitan area will be limited because of the New York City Fire Department's restrictions against bulk storage. Plants in this area must first get approval from the Fire Department on location of LP-gas storage before they decide to use it.

4. LP-gas-fueled trucks can be used for any purpose now approved for gasoline-fueled trucks, such as:

a. Ordinary hazard occupancies.

b. Hazardous locations as classified in Article 500, National Electrical Code, and Section 32, Canadian Electrical Code. For example:

Class II, Div. 2—Location in which explosive mixtures of combustible dusts are not normally present or likely to be thrown into suspension through the normal operation of equipment.

Class III, Div. 2—Locations in which easily ignitable fibers are stored or handled, except in the process of manufacture.

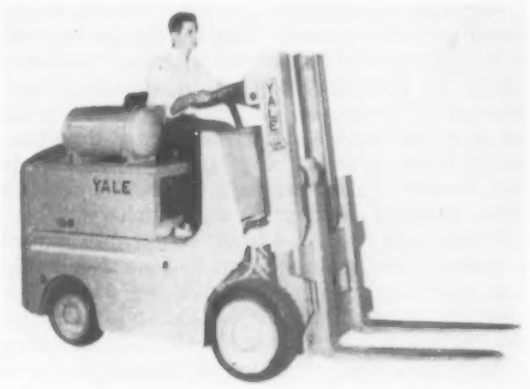
5. Since the large producing area of LP-gas is in the Southwest, the shorter the rail haul from the Southwest to destination the cheaper the fuel.

LP-gas in the Texas-Oklahoma area is 4¢ per gallon, f.o.b. refinery.

PRICE COMPARISON TABLE

Area	Gasoline	Propane
Wichita	14.4¢	5.5¢
Chicago	17.3¢	10.4¢
New York	14.7¢	11.4¢
Charleston	14.5¢	9.6¢
Miami	15.2¢	10.7¢

(These prices are approximate)



THIS FORK LIFT TRUCK was engineered by the manufacturer to use LP-gas. Tank alongside the operator holds liquid fuel. A vaporizer under the cover converts liquid to gas.

JOE'S DEPARTMENT

ELECTRICAL IDEAS EVERY PLANT MAN CAN USE

By JOE ST. ANDRE • Electrical Editor

With an emergency power set, you'll be . . .

All Set for an Emergency

WHAT HAPPENS in *your* plant when there is a power failure? One minute you have a plant teeming with activity. The next, all your buildings are plunged into darkness. I mean *darkness*. Machine tools and processes grind to a halt. This is it, men. An emergency. Are you ready? What comes first? And just exactly where do you go from there?

What do you do when the lights go out?

Your first concern, of course, is safety to personnel. Panic is your biggest worry. A dark factory can be *really* dark. And if your plant happens to be the windowless kind, there's nothing blacker when the lights go out. So the first thing you need is emergency lighting. And you need it in a hurry.

This lighting can be obtained from a number of sources. Small engine-driven generators, battery-operated units, gas-driven welding sets are all possible power sources. The big idea is to get light and get it quickly.

You don't need too much light. My choice, therefore, is a small lighting unit consisting of a storage battery, a trickle charger, a relay, and a couple of sealed-beam headlight bulbs such as you might use on a motorcycle.

The relay is held open by its coil as long as the power is on. If the power fails, the relay drops and closes the contacts that put on the emergency lights. The battery supplies the necessary current. As soon as the power is restored, the relay picks up, disconnecting the battery power, and the emergency lights go out. The relay also has contacts that connect the battery to a trickle charger. It's vital, of course, to keep the battery charged.

These units don't cost a lot. So you can scatter a number of them around your plant. This not only cuts down on wiring costs, but also gives you insurance gainst failure of the battery, failure of the contact-making device, or burned-out lamps.

As a rule, don't count on burning your emergency lighting for any great length of time. Remember, all it's supposed to do is help you avoid panic caused by the sudden plunge into darkness and enable you to evacuate the buildings. The electrical department should be able to estimate in a short time how long the regular lights are going to be off and so advise management. You can then decide if people are to be sent home.

Some processes can't stop at the drop of a hat

How about them? How long can they stand up without power to make the wheels go around?

Obviously, you can't expect to have enough standby power to operate the whole plant. Furthermore, most of your equipment can shut down without loss—except to production. But there are processes and equipment that just can't be shut down fast, or even shut down at all.

In one plant I visited only a few weeks ago, sump pumps handle plant industrial waste into a pressurized sewer. Stop those pumps for 10 minutes and you have the basement flooded. The cafeteria is in that basement. Health laws would force this plant to spend thousands cleaning up the mess.

A West Coast plant transports a salt solution through miles of piping. A shutdown there and the solution would solidify in the pipes, making it necessary to rip out the whole smear at huge cost.

Emergency power where you need it

For these special places in your plant that just have to have power, why not use engine-driven generating units to guard against possible failures of your electrical power? In general, several small sets will serve your purpose better than one large one. You can service small loads right at their locations. All you need is a transfer switch at the motor or furnace to switch to emergency power.

If you use one large unit, you'll have to have a separate wiring system to reach all these isolated power needs. You can't hope to use any of your present wiring. Anything connected to such a system could be started up and loaded on to the emergency generator. You would soon have an overloaded generator on your hands.

No place for controls that aren't automatic

Whether you use several small units or one large one, you need automatic controls that will start the engine, build up the required voltage, and transfer the generator output to its proper load. This is no place to pinch pennies.

I see so many emergency units that depend on an attendant to start them up. Usually this job is inherited by the electrical department.

Here's the trouble: When the power fails, the electrical department is up to its ears in trouble. The man assigned to start the emergency set is sure to be at the other end of nowhere. Or this is his day off and he has gone fishing. So the much-needed power doesn't come on. The sewers flood. The furnaces shut down. And the pipes become solid.

There's only one answer. Automatic controls.

"What should these controls do?" I asked William Stelter, chief engineer, Synchro-Start Products, Inc., Chicago.

"The first consideration in emergency power supply is the elimination of the human element," he said. "You want a watchman that is never asleep, never absent, and never disobeys orders. It must not only start and stop the engine. It must also protect both the engine and electrical system against abnormal conditions while running."

If the engine is a little hard in starting

In most emergency power sets, the engine is started by means of a battery. Point No. 1 is to be sure this battery gets proper attention. See that it's checked at regular intervals and after every operation. Sometimes the engine will be a little hard in starting. This may run the battery down. Of course, you have a trickle charger on the battery. But you'd better have some way of putting a full charge into it. Better yet, have a duplicate battery standing by. You can never tell how soon the engine may have to start a second time.

Should the engine fail to start at once, limit your cranking to about 25 seconds. Wait maybe 10 seconds. Then try again. This time the cranking should not exceed 7 seconds. If the engine doesn't start, the above cycle should be repeated five times; then lockout.

Meanwhile an alarm signal should be sent out, either audible or visual. If you have two units, the controls would be shifted to the second set. Be sure the controls don't allow the engine to run down the battery to a point where it won't turn the engine over by the time an attendant gets there to see why the engine won't start.

A low-fuel alarm is also a *must*. It always seems to be the "other fellow's job" to put gas in the tank. So your emergency power suddenly quits on the job when it is most needed. And you should include temperature alarms to guard against overheating due to low water in the cooling system.

These are the electrical controls you need

Time is of utmost importance. You want the engine to start up as soon as possible. The generator should build up its voltage and frequency in a minimum of time. The load should be transferred to the generator in a matter of seconds.

For smaller installations, the "packaged" generator will have a compact control panel mounted on the generator. For larger units, a more elaborate switchboard will have to be mounted separately. In either case, you need:

1. A voltage-sensitive relay to function on loss of normal power source or prolonged low voltage of 80% or less of the rated voltage.

2. A voltage relay and a frequency relay to make sure the generator is putting out the correct power before it is applied to the load. Incorrect power is worse than no power at all. It will burn out the equipment to which it is being applied. When normal power is restored, you will be out of production, perhaps in worse condition than if you had not used emergency power.

3. Transfer switches for applying the emergency power to the load to be serviced.

4. Relays for restoring loads to the normal supply when power is restored. Make sure the loads are transferred back to the normal supply only after a predetermined time interval. Often power is restored for test purposes only while you're trying to locate the trouble that caused the outage in the first place. You don't want to be transferring back and forth from emergency power to normal power during these intervals. A timing relay will take care of this.

5. Controls to shut down the engine after the load has been transferred back to normal power. You should not depend on an electrician's memory. The electrical department will no doubt be busy with service calls because of the power outage.

Your emergency engine set may not be called upon to operate more than once or twice a year. The fact that it is automatic in its operation often puts it in the "out of sight, out of mind" class of equipment. Don't make that error.

Once a week is not too often to test the unit. Start the engine and run it for 20 minutes. You may even want to record your testing on the chart of a recording voltmeter attached to the generator itself. In that way you will have not only a record of the time the set was tested but also a performance record of the generator.

Whatever record you may set up, it should be checked to see that the unit gets its proper attention and periodic inspection. Then—and then only—can you be sure of your emergency set.

Need help with your problems?

IMPORTANT NEW Free CATALOGS

. . . they're the cream of this month's crop . . . They describe latest methods and equipment. Tell us which ones you want. Use the handy coupon at the bottom of the page. If somebody beat you to it, there's another on page 262.

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DUPLICATE COUPON ON PAGE 262

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PIPELINES & FITTINGS 260
MISCELLANEOUS 262
PLANT ENGINEERING 264
PLANT OPERATING 268

Remington Rand Methods News

A 20% increase in productivity with visual scheduling

An aluminum fabricating plant wanted to apply the Gantt principle of charting work done against work planned. After a study, they chose Sched-U-Graph boards as the most rational and simple device for charting daily progress of each item, part and sub-assembly on defense and civilian orders.

Their experience shows many definite advantages flowing out of this visible method for production scheduling. The big, bold charts make it easy for everybody to grasp all significant facts on machine loading, scheduled future loading, each variation from schedule, and the movement of each work order by operation.

Also, the Personnel Department can now *see clearly* how many employees will be needed – and when – in each productive department. The Sales Department can advise a customer well ahead of time if a schedule will not be met exactly. The Production Engineer can determine hours each machine has been used as well as scheduled future use – for efficient planning of his preventive maintenance work and replacement of equipment.

The most important advantage, of course, is that of insuring a continuous production flow through quick spotting of any bottlenecks which may cause serious delays. Production officials of the plant conservatively estimate that a 20 per cent increase in productivity is effected by this Sched-U-Graph visible method. For more details, see our scheduling manual **KD-341.**

CAN YOUR PURCHASING DEPARTMENT DO MORE TO HELP PRODUCTION?

There's a new way to increase the effectiveness of purchasing records. It's a simple checklist to help the buyer get complete information without burdensome detail. Checking it over just once with care may point the way to more efficient procurement of materials and equipment for your production needs.

This checklist is just one of the valuable features in a new 20-page manual of purchasing procedures to save time and money. It's full of practical ideas which will be easy to apply in your purchasing office.

You'll find here plenty of case histories showing how other firms help buyers make sound decisions faster, get orders placed and delivered sooner, slash purchasing paperwork, give clerks more responsibility, reduce the number of items to be purchased, etc.

Also, you'll see the actual forms and methods used in many firms – for every phase of paperwork from receipt of the requisition to closing of the order file. Ask for your copy of this new purchasing procedures manual **X-1202.**

A pressure problem for engineers, and how it was solved

The teletypes pounded urgently. Air Force officials wanted to know by 6:00 P.M. if a new alloy could be substituted in building the giant C-124 Globemaster transport.

The engineering chief of this division scanned the teletype, hurriedly made notes on its contents, dispatched the original to the typing pool. Minutes later, 20 neat copies of the message were placed on the desks of sub-chiefs concerned. This plant gets *fast action* from its Electri-conomy typing pool. Their all-electric typewriters, equipped with a special type face for legibility, can produce up to 20 neat copies from a single typing.

Electri-conomy helps relieve pressures on Engineering in many other ways, too. On big jobs such as bills of materials, parts catalogs and price lists, many typists can work simultaneously yet with uniform "touch" for uniform readability from page to page. This is especially important when material must be reproduced by stencil, offset or photographic means. And a later revision of any page will have the same uniform readability.

Regular work such as engineering changes, orders and reports is also turned out faster because this electric typing method requires less effort, reduces fatigue. Turnover in the typing pool has been reduced since they switched to Electri-conomy. For further details, see our engineering case history **RE-8548A** and folder **RE-8356.**

The case of the unpopular punch press

When a well-known manufacturer of engine parts switched to Remington Rand punched-card costing, the new detailed reports revealed surprising doings in the shop.

For instance, one report indicated a certain type of punch press was the most efficient on a particular operation. But another report showed the press was not often used on this operation. Investigation revealed that workers preferred a different type of press which was easier to operate. Management now had all the facts needed for effective action.

What's more, this new system put the finger on profit leaks much faster. Instead of waiting 30 days to get sketchy facts, management now gets complete cost reports 5 days after completion of a job.

Naturally, costing is just part of the punched-card accounting operation which helps the firm produce better products at lower cost with better service to customers.

Let us show you how it also simplifies control of parts inventory, scheduling production for warehouse stocks, and writing payrolls. Ask for case history folder **SN-752.**

If you'd be interested in punched-card services to give you the same informative records without the need of setting up your own punched-card department, ask for our folder **BSD-6.**

Remington Rand

Management Controls Reference Library
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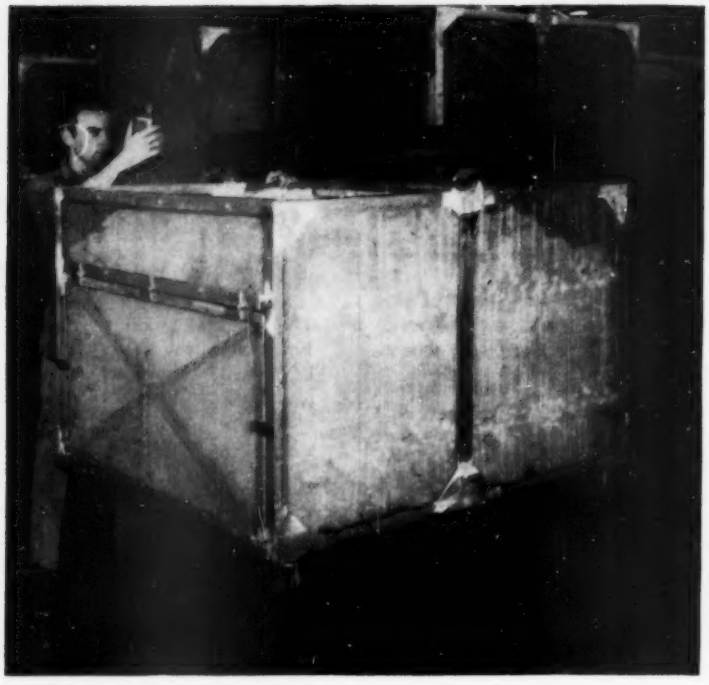
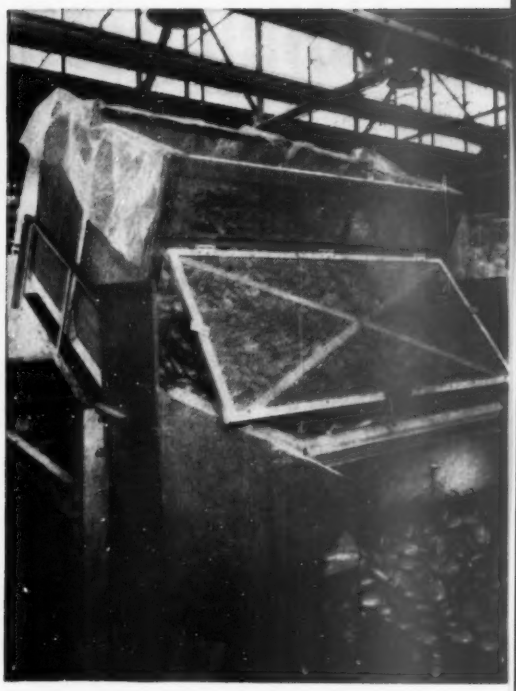


ROLL IT, LIFT, STACK IT. Handler at Plax Corporation uses crane to stack all-purpose container on storage racks. Bin has casters for rolling, gate for dumping.



DUMP IT. Elevating device tilts bin to dump bottles into hopper at finishing bench.

They used to move materials in bags and barrels—
and had barrels of trouble—
until company maintenance engineers designed . . .

A Bin to Fit Varied Handling Needs

ONE CONTAINER for all handling needs? Plax Corporation (plastic bottles, West Hartford, Conn.) wants to know why not. Its maintenance engineers have designed a tote bin that serves the entire process—from raw materials to packaged product.

THE BIN • Made of ¼-in. steel framework that supports walls of galvanized aluminum screening. It's 4 feet square, 32 inches deep. Weighs about 65 pounds empty. Equipped with 3-in. casters. Gate, locked by an old-fashioned bolt latch, swings open to permit quick and easy dumping. Attachments on frame accommodate lift hooks.

And the cost? Just under $200 apiece.

THE BENEFITS • The new containers replace the polyethylene bags and barrels in which Plax used to move raw materials and finished products.

Now . . .

. . . **production flow is more efficient.** There's less congestion. For instance, one bin will hold more than 10,000 average-sized (4-oz.) bottles. The same 10,000 bottles would fill seven of the barrels formerly in use.

. . . **less materials handling manpower is needed.** The company estimates that it's saving the time of five men. That's because with fewer containers there's less moving to be done.

. . . **production is safer.** No more cut hands. There were plenty of minor cuts when employees had to handle barrels. Also, there's less congestion—which always aids the cause of safety.

. . . **product quality is better.** Bottles are now kept clean and ventilated, free from scratches. Damage caused by handling has been practically eliminated.

CLARK
1953
POWRWORKERS

"Job Engineered" to do a hundred and one jobs

POUND FOR POUND, dollar for dollar, you can't beat the value in CLARK'S POWRWORKER Line. You get big-truck benefits at rock-bottom, small-truck cost. Take the POWRWORKER stacker, for example: a rugged, modern fork truck, but cut to fit the tighter handling pattern of narrow aisles, low-load floors, limited budgets. Short turning radius, easy finger-tip control and ample power-plant assure fast, safe handling and stacking. Truly big-truck performance in an economical package.

Ask your CLARK dealer about the POWRWORKER models: stacker, pallet truck, platform truck and tug tractor —"walk 'em or ride 'em." These power-packed time-savers are job-engineered to cut your handling costs in a hundred and one ways. They're built right and priced right to give you top-dollar value.

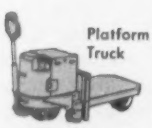
CLARK MATERIALS HANDLING EQUIPMENT

THE SIGN OF THE BEST BUY LINE

1903 1953 FIRST FIFTY YEARS CLARK EQUIPMENT

Tug Tractor

Pallet Truck



Platform Truck

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS

AND POWERED HAND-TRUCKS • INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BUCHANAN 12, MICHIGAN

Please send: ☐ Powrworker literature ☐ Material Handling News ☐ Have Representative Call.

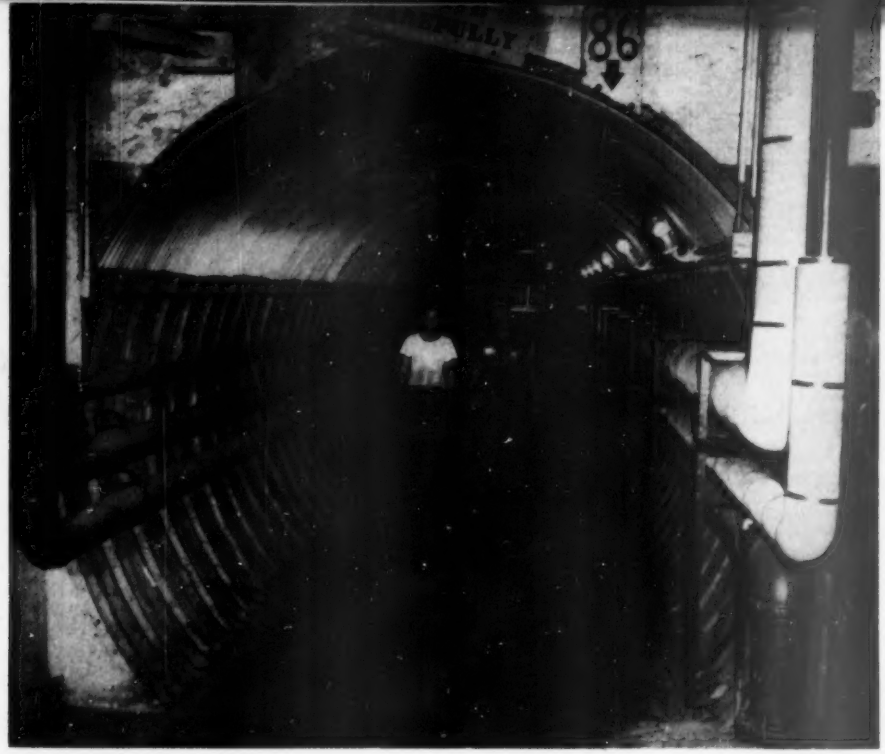
Name_____

Firm Name_____

Street_____

City_____ Zone_____ State_____

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS



Its plant split by railroad, Thompson Products built...

...Tunnel Under Tracks to Link Buildings

By E. L. FOUNTAIN • Superintendent of Maintenance
Thompson Products, Inc., Cleveland

WHAT DO YOU DO when a railroad splits your plant in two? Do you go over, under, or around?

That was the situation at our Clarkwood Avenue plant in Cleveland. So we pulled the plant together by installing a vehicular and pedestrian tunnel under a 4-track elevated mainline of the Pennsylvania Railroad.

You're probably wondering how we found ourselves on both sides of the tracks. Gradual expansion did it. Hemmed into a crowded industrial area, our plant was formerly located on one side of the railroad. Growing, we spread to the best available space—buildings on the other side.

An enclosed passage, suspended from the railroad bridge, helped some. Our employees used it to cross the tracks. But moving material and equipment between buildings meant loading trucks for roundabout trips through busy city streets.

The tunnel has wiped out our transportation troubles. It's a smooth, economical intra-plant highway for men, materials, and machines. It's also a shortcut to lower gas bills—lets us put all our buildings on one, instead of two, meters.

The tunnel, built by Armco Drainage & Metal Products, Inc., is 66 feet long and has an inside diameter of 11 feet 3 inches. It's constructed of high-strength galvanized tunnel liner plates with a bitumastic coating on the outside. Air spaces between liner and excavation were grouted through plugs inserted in the liner plates at the top of the tunnel. A corrugated protective "umbrella"—bolted to the upper part of the tunnel—stops the seepage caused by train vibrations.

Inside, the tunnel is well lighted and painted. The floor is paved with concrete. Nuts and bolts, used to assemble the liner plates, are convenient attachments for electric conduits and gas, water, and steam lines.

The tunnel's depth was held to a minimum to reduce the length of ramps at either end. Construction involved breaching—by drilling and blasting—two concrete retaining walls that support the railroad. The bottom of the tunnel is 18 inches below the 8-ft-thick base of each wall. A railroad inspector was always on the job, but the project was finished without difficulties and without slowing trains.

We've checked every six months for settling or structural changes. In four years, we've found variations of no more than a small fraction of an inch. That satisfies us.

SERIOUS PRODUCTION LOSS STOPPED BY SWITCH TO SUNVIS H.D. 700 OILS

VARNISH NO OBSTACLE—This is one of the many presses of various sizes which form joints in abrasive sanding belts for production use in the automobile, jet engine and woodworking industries, as well as many others. Six years ago equipment like this press needed costly maintenance at frequent intervals because of varnish formation. Then a Sunvis H.D. 700 Oil was adopted as the hydraulic medium, and the trouble disappeared like magic.

NO OIL CHANGE—This large press is used for joining abrasive belts used in polishing stainless steel. Although the oil temperature at which it operates is 130 F, the 200-gallon charge of Sunvis H.D. 700 is still in excellent condition after nearly four years' use.

Among the 30,000 types of abrasive specialties made by Behr-Manning Corporation, Troy, N.Y., Division of Norton Company, are sanding belts requiring smooth, uniform joints. Dozens of hydraulic presses, ranging in capacity from 5 to 150 tons, form the joints to the same thickness as the belts.

The hydraulic oil in use six years ago created a production obstacle by forming varnish in the pumps and valves. At least once a year the systems had to be overhauled and the pumps sent to the manufacturer for repairs, with consequent production loss.

Behr-Manning then changed to Sunvis H.D. 700 Oils, as suggested by a Sun representative. Because of the detergent-dispersive characteristics and high stability of these oils over a wide range of speeds, loads and temperatures, varnish formation was immediately cleared up. Since that time, no overhauls traceable to oil have been necessary. Annual savings in pump repairs have been substantial and no oil changes have yet been required.

For complete information about "Job Proved" Sunvis H.D. 700 Oils, fill out the coupon below.

SUN OIL COMPANY, Dept. F-2
Philadelphia 3, Pa.

We are having trouble that may be caused by an **inadequate** hydraulic oil.

☐ Please send me booklet "Sunvis H.D. 700 Oils."

☐ Please have a Sun representative contact me.

Name_____

Title_____

Company_____

Street_____

City_____ Zone____ State_____

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MAINTENANCE POINTERS

FOR PLANT OPERATING EXECUTIVES

By CARL G. WYDER • Maintenance Editor, FACTORY

► Activated carbon units keep neighbors happy by . . .

. . . Taking Odor out of Smelly Stack Gases

Odors from the stacks of the ovens for baking transformer wire at Acme Wire Mills, Inc., Paterson, N.J., were a neighborhood nuisance.

First approach to the problem was the installation of catalytic burners. They helped considerably to remove combustible matter and gummy unburned residue resulting from improper firing. But most of the odor remained. And the local health department was parked on the doorstep.

So Acme called in Kevin B. Magee, a consultant, to solve the problem. He determined from an analysis of the lacquers and solvents used that the stack gases could be readily absorbed by activated carbon. He chose Connor Engineering cell units to provide maximum filter face area in a minimum of space. For convenience, the housing was erected on the roof.

Several problems were involved. For optimum absorption the gases could not exceed 118 F. Hence it became necessary to dilute 250 cfm. of hot gases with 5750 cfm. of plant air before passing them through the activated carbon units.

To prevent clogging, impingement dust filters of the cleanable metal type were installed ahead of the carbon banks. They are shown above in left compartment; carbon units are in right compartment.

Another problem was the need to keep the coating room at a slight negative pressure to prevent contaminating outdoor air by odors filtering out. This required careful adjustment of special stack, suction, and by-pass dampers.

"It's Impossible to Lick the Employee Smoking Problem"

If that's the way you feel about it, you'll be interested in how Leeds & Northrup, Philadelphia, met the problem.

Like many plants, there are certain places at L&N which constitute normal fire hazards. Originally smoking was allowed only in private offices, then later in all office areas.

Eventually the question came up as to why white-collar workers in the plant offices shouldn't be allowed to smoke. So in typical L&N fashion a committee was set up under Vice President Schofield to study the whole problem.

The result was a smoking plan for *all* plant employees. This plan set up permanent "No Smoking" areas in permanent hazardous locations, and temporary "No Smoking" areas wherever temporary flammable hazards existed. These areas were marked by signs and lines or markers.

Smoking is not allowed in washrooms or locker rooms. Those who smoke must use approved ashtrays, and empty them at least once daily into gray containers with an orange band. Obedience to rules, said the company, was to be self-policing. Penalties of suspension and discharge would be imposed on those who ignored warnings.

When the plan was put into effect, an orange and gray folder titled "Smoking Plan" was distributed as a payroll stuffer. And now every new employee is given one. Bulletin-board notices remind employees of the agreement.

The plan, says L&N, has worked well. It has never been necessary to apply the extreme penalty of discharge.

If interested, you can get a copy of "Smoking Plan" direct from Leeds & Northrup, Philadephia 44. Be sure to check local and state fire regulations if you want to try it out yourself.

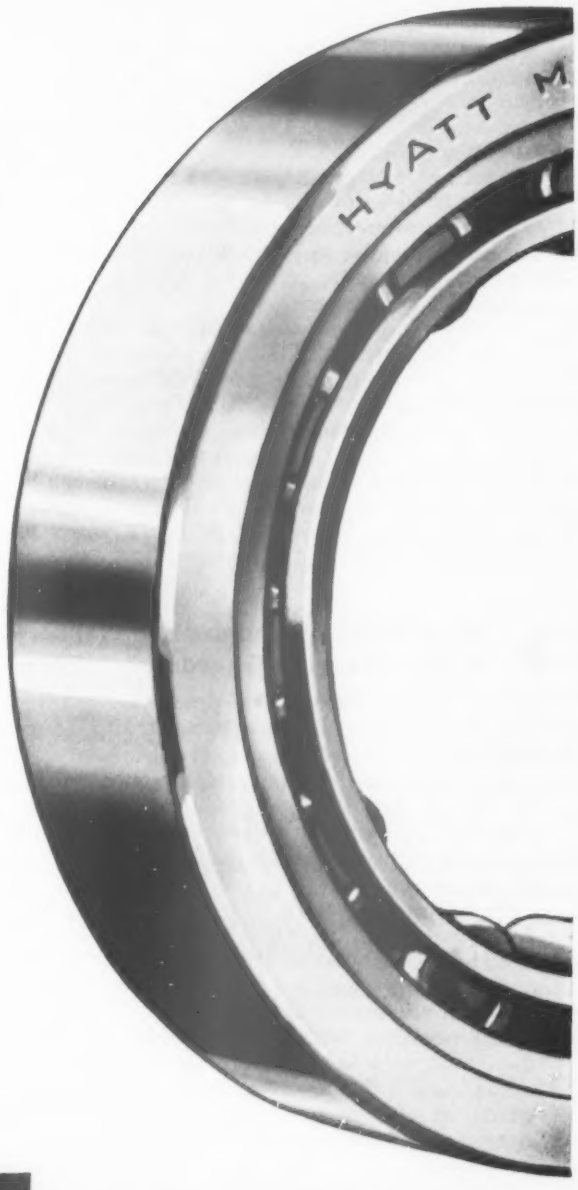
Want to Talk Shop With Other Plant Engineers?

Then take a look at what's happening at the monthly plant maintenance meetings held by the Philadelphia chapter of The Society for the Advancement of Management.

Early in 1951 some of its members realized

10 designs for heavy duty

Ten different Hyatt Hy-Load designs, each in a variety of widths and sizes, assure you the right bearing for every radial need.
Four Hy-Load designs have separable inner races, two have separable outer races and four are non-separable. All are high-capacity, cylindrical roller bearings for the heaviest radial loads and light or intermittent thrust loads.
All separable parts are freely interchangeable within the same size. This permits non-selective fitting after pre-assembling the two bearing parts in separable machine elements.
Whatever your radial load problem, Hyatt Hy-Loads or some of the other types of Hyatt bearings can provide the answer. Because Hyatt offers industry's most complete line of straight radial roller bearings. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.



HYATT ROLLER BEARINGS

 . . . Begins on page 150

there was a growing need for discussion of maintenance problems as a part of management responsibilities. They set up a program of monthly evening meetings and invited plant executives to attend. You didn't have to be an SAM member to rate an invitation.

The subjects were spread over problems of the administration and management of maintenance, as well as broad technical problems. For example, separate sessions have covered training of maintenance workers, planning and scheduling work, setting up a preventive maintenance program, laying out an electrical distribution system.

The editors of FACTORY have enjoyed attending many of these meetings. We have watched attendance snowball from a baker's dozen to scores of interested men. They have reached the point of interest where attendance has had to be limited to the first 80 or so to sign up for a single meeting.

The keen interest in these meetings shows what you can accomplish in your own community. Perhaps you can needle your local SAM chapter to duplicate these sessions.

If you want to know where there's an SAM chapter near you, write C. A. Slocum, Executive Director, Society for Advancement of Management, 411 Fifth Avenue, New York 16. And if you want more details about the Philadelphia activities, write to Ervin Seltzer, one of the group that has promoted and guided the meetings so successfully. He can be reached at The International Resistance Company, 401 North Broad Street, Philadelphia 8, where he is manager of industrial engineering.

More Plant Mechanization Needs Better Machine Guards

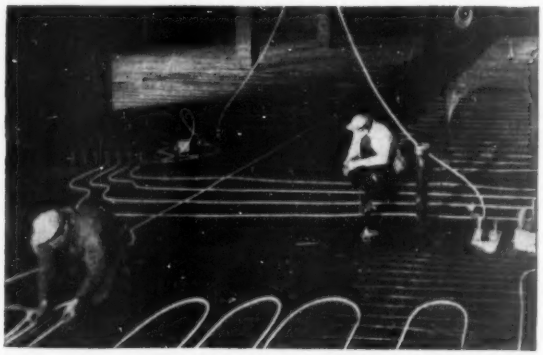
So said Len P. Walters, loss prevention research manager for the Hardware Mutuals, at a recent Philadelphia conference.

Why? Because more maintenance men will be on the job. And since they will be more highly paid than production workers, accident costs will be higher. Also, their skills during lay-up will be harder to replace.

His point is well made. "New machines will produce complicated products in several steps instead of several hundred," he said. "But, as always, maintenance workers must remove machine guards to get at the source of trouble, and to test and adjust machines while they are running. Often they must work in locations where no production worker would be allowed to work, even in plants which at present are only moderately safety minded." In other words, exposure to hazards will be greater.

There's still another reason, says Walters, to guard this new automatic machinery better. An accident that damages an automatic machine will cost more in terms of machine repair and lost production than one involving indemnity to workers.

To some of us this may seem like a cold-blooded approach. But when the proper humanitarian approach is backed up by this economic justification, good machine guards won't be looked on as just an "extra," but as a "must."



► A new twist in radiant heating uses . . .

. . . Plastic Tubing for Floor Heating Panels

When the Pump, Pipe & Power Company of Portland, Me., decided two winters ago to switch from warm air heating to radiant heating, it looked for economy in installation cost plus heating comfort.

It got both. Workers like to work on the new warm floor. And PP&P, by using its own shop labor, saved $3000 over the nearest estimate on labor alone. Use of ¾-in. Carlon C plastic tubing was a big factor in this saving.

PP&P learned a few things: Tubing must be uncoiled properly so twists won't tend to raise it off the floor. Return bends need to be hooked down until straight runs are tied down at 2-ft. intervals. When pouring concrete over the tubing, you have to keep the system filled with water under a constant pressure. This you can do by connecting it to an elevated storage tank. Also, you have to make sure all air is vented, to avoid constrictions.

The job in the new 70x100-ft. PP&P building took 152 man-hours—52 hours for laying out iron feed and return lines, 94 hours for installing and testing the plastic tubing, and 6 hours for checking it during the pouring of concrete.

This type of heating system can be installed in any existing plant. Later on, PP&P installed a similar system on the concrete floor of its existing warehouse, using 2½ inches of concrete topping.

Turn to page 264 for good ways to solve special plant engineering problems

DOW CORNING SILICONES

make motors last longer

Paid for itself 30 times in 2 years

Tough operating conditions are the order of the day for the 5 hp hot-ingot conveyor motor at The Infeld Metals Corporation in Waterbury, Conn. Jogged on a 20-second cycle, it never gets up to speed. An unending procession of freshly-poured ingots at 600° to 2100° F passes within a few feet of it. The quenching system keeps it enveloped in clouds of steam.

The motor used to fail at least every 3 weeks. Rewinding with Class A insulation cost about $109. Down time and lost production expenses were about the same.

Two years ago the motor was rewound by the Electric Motor Repair Company of Waterbury with Dow Corning Silicone (Class H) Insulation. The initial cost was higher—approximately $235—but the motor has not failed since. Based on the 3-week service life of Class A, that means Class H has paid for itself over 30 times, saved $3471 in rewind costs alone.

That kind of performance in thousands of installations has proved that Dow Corning Silicone Insulation has 10 to 100 times the life expectancy of the next best class of insulating materials; increases the power pound ratio in electrical equipment by as much as 50%.

CUT HIGH TEMPERATURE BEARING FAILURE WITH DOW CORNING 44 SILICONE GREASE

In open and single shielded bearings designed for high temperature operation, Dow Corning 44 Silicone Grease has 8 to 10 times the life expectancy of conventional greases. It gives lifetime lubrication in permanently sealed bearings.

mail this coupon Today

Dow Corning Corp., Dept. L-2, Midland, Mich.
Please send me:
- ☐ Catalog of Class H Insulating Materials.
- ☐ List of Class H motor repair shops.
- ☐ Data on Silicone Grease for motor bearings.
- ☐ 32-page booklet entitled "What's A Silicone?"

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Camera Helps Fix Responsibility for Damaged Goods

Photos taken in freight cars reveal . . .

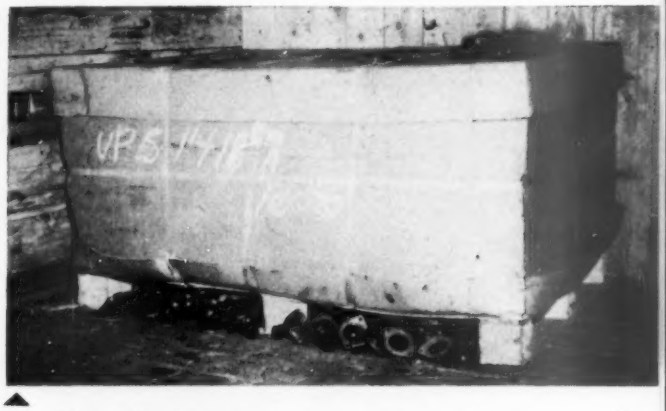
SHOW 'EM WITH PICTURES. That's how the Lincoln-Mercury auto assembly plant, Metuchen, N. J., takes the paperwork out of investigating damaged freight-car shipments.

When damaged goods are found in a car, Materials Handling Engineer Russell Skillman photographs them before they're unloaded. He sends several prints to the Detroit home office for filing and distribution to responsible parties—railroad, vendor, or pool-car people. His photographs invariably show one of three causes—poor loading, poor packaging, or poor handling by the railroad.

Skillman's photo reports fix responsibility for damage and reduce correspondence between Metuchen and Detroit. Within a few minutes after damaged stock is discovered, he shoots his picture, thus minimizes delays in unloading cars.

He uses a 4x5 Speed Graphic, gets best results by supplementing normal lighting with a synchronized flash.

. . . Poor Loading • Lack of bracing makes car interior a shambles of broken cartons and spilled pallets.



. . . Poor Packaging • Normal vibration and movement bursts bottom of inadequate pallet-pack, spilling contents.

. . . Poor Handling • Rough treatment by railroad tears braces from wall blocks, upsetting palletized transmissions.

"WHY DON'T YOU TRY AETNA? YOU'LL BE SURPRISED AT THEIR VERSATILITY"

Yes, Aetna *is* versatile. For 37 years Aetna has been making original equipment bearings and precision parts for the nation's leading manufacturers in the automotive, farm implement and general industrial fields.

From conventional light duty thrust bearings in 1916, Aetna's versatility has grown to include all-type-all-duty ball thrust bearings, roller bearings and vital parts spanning an incredible range of industrial applications.

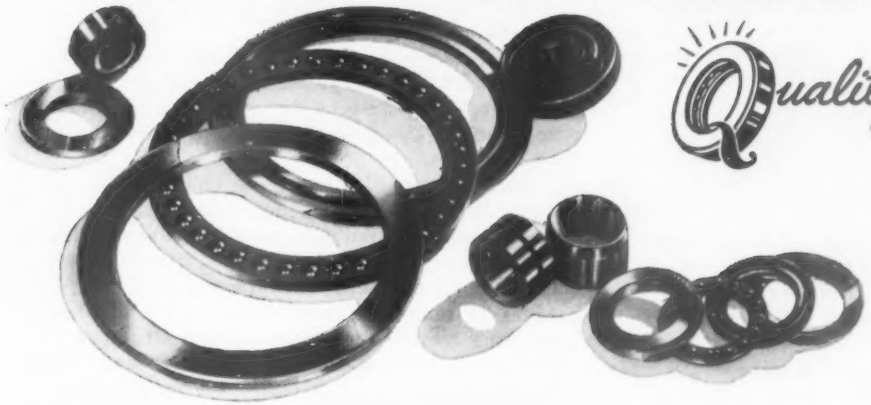
It's worth remembering—Aetna's diversified usefulness to industry—Aetna's reputation of producing to the stiffest tolerances known to the industry.

If you are having bearing or parts troubles—if you need a more versatile, more dependable supplier, consider Aetna. Your satisfaction is assured by the fact that 80% of our business comes from firms we have served for 20 or more of our 37 years. Write! Just state your problem, send your prints, or ask that a near-by representative drop in.

No obligation. Aetna Ball and Roller Bearing Company, 4600 Schubert Avenue, Chicago 39, Illinois.

Aetna

BALL AND ROLLER BEARINGS • MISCELLANEOUS PRECISION PARTS



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WHAT'S NEW IN EQUIPMENT

. . . BRIEFED HERE FOR THE CONVENIENCE OF PLANT OPERATING MEN IS INDUSTRIAL PLANT EQUIPMENT NOW ON THE MARKET . . .

MAINTENANCE TOOLS & SUPPLIES ➡

AUXILIARY EQUIPMENT 163

ELECTRICAL EQUIPMENT 170

MATERIALS HANDLING 178

MEASURING & CONTROL 190

SAFETY & PLANT PROTECTION 198

VALVES & PIPING 200

MISCELLANEOUS 204

IN THE NEXT ISSUE ..... **Some notes on important late items. More about them next month.**

Air-powered hydraulic pump and safety ram combination is designed to make light of the heavy jobs. Pump provides smooth pressure from 0 to 12,000 psi. Ram unloads itself automatically.
Powermatic, Inc., 1944 E. Market St., Akron 5.

Welder's variable eye shade needs just a twist of the wrist to adjust to different light intensities. You get good visibility, continuous protection, don't have to waste time changing shades. Fits all standard helmets.
Polacoat, Inc., 9794 Conklin Rd., Blue Ash, Ohio.

Remote signaling system allows operator to start any operation that can be remotely controlled by a relay. Single radio frequency tone does it. Designed for use with radio, land lines, microwave, or power line carrier.
Motorola, Inc., 4545 Augusta Blvd., Chicago 51.

Chain breaking tool disconnects any pitch roller chain made to specifications of American Chain Mfrs. Assn. from 1/4-in. to 3/4-in. pitch. Pressing tip is case-hardened tool steel. Vital parts are heat treated.
Boston Gear Works, 14 Quincy St., Quincy 71, Mass.

New tool tester detects electrical defects in electric hand tools and extension cords. Electrically-untrained person can complete test in less than 10 seconds.
Fendall Co., 4633 N. Western Ave., Chicago 25.

Versatile Steel Framing System

PLANT MAINTENANCE and construction framing problems are cut to the bone by this flexible, all-bolted steel framing system.

The easily installed and completely adjustable framing consists of specially designed components for the economical construction of all kinds of frames, hangers, and racks.

The line-up of features offers you a wide range of concrete inserts, pipe rollers and hangers, clamps, and other fittings suitable for such diversified applications as tunnel framing, hanging fluorescent lighting fixtures and other electrical equipment, and for general support and racking in your heating, plumbing, and air conditioning installations.

The concrete inserts have a load-carrying capacity of 2000 pounds per lineal foot. For hanging fluorescent fixtures the use of 12-gage channels enables you to place hanger rods on centers up to 15 feet.

And you can also use these channels as raceways on interval-spaced installations.

Serrated nuts eliminate the need for any drilling or welding. Nut makes only a quarter turn with the channel, then bites into the channel's inturned edges to make a permanently snug and secure fit. This feature makes the system's components completely reusable and adjustable, and ideal for either permanent or temporary installations.

Flexa Steel Products, Inc., 1348 W. Washington Blvd., Chicago 7.

Turn the page

Ordering Steel Products Is No Problem When...

All You Have To Do Is Call...

The J&L Warehouse nearest you

From its seven warehouses, J&L is ready to fill your requirements for controlled-quality steel products.

Under one roof, you'll find a "department store for steel" stocking a wide variety of steel alloys, shapes and sizes, in addition to many special J&L steel products.

JONES & LAUGHLIN STEEL CORPORATION

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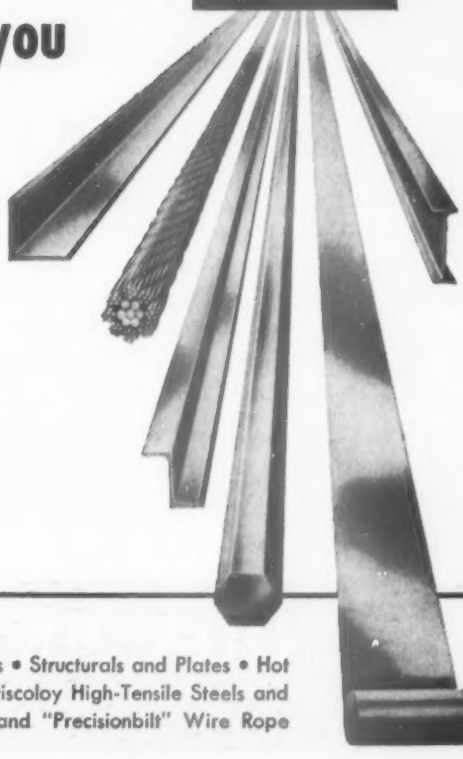
Detroit 7, Michigan	WAlnut 1-0470
Memphis 1, Tennessee	5-1625
New Orleans 6, Louisiana	FRanklin 1131
Pittsburgh 3, Pennsylvania	HEmlock 1-1000
Long Island City 1, N.Y.	RAvenswood 9-8700

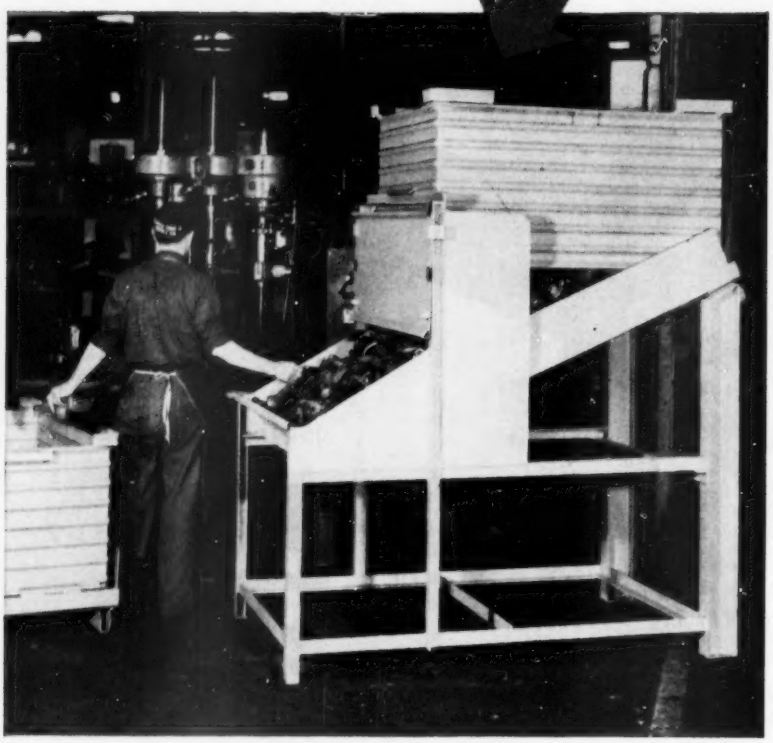
J&L STEEL



Principal Products:

Hot & Cold Finished Bars and Shapes • Structurals and Plates • Hot & Cold Rolled Strip and Sheets • Otiscoloy High-Tensile Steels and Jalloy Plate • Tool Steels • Wire and "Precisionbilt" Wire Rope

Will your skid boxes do THIS?



Work-O-Matic* Boxes cut waste motion!

WORK-O-MATIC drop-bottom box and stand units, as shown, *automatically* position and feed parts at work level! Tiring, inefficient bend-and-stretch procedure is eliminated. Moreover, supply delays are avoided because the reservoir tray "bridges the gap" while the empty box is being replaced. Filled boxes are quickly, easily fork-lifted into position.

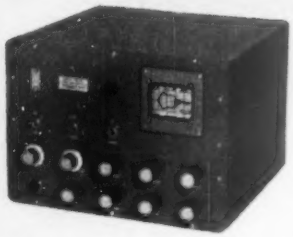
These and other unique advantages mean up to 50% production gains in job after job. So get *all* the facts! Write to The Union Metal Mfg. Co., Canton 5, Ohio, for Folder MH-809 and T & M Studies.

*Patent No. 2,445,038. Other patents pending.

UNION METAL
Materials Handling Equipment

Begins on page 156

MAINTENANCE TOOLS & SUPPLIES



For Maintenance and Testing of Servo Systems

Here's a futuristic type of maintenance tool — the 101-A Servo Tester. It's designed for the rapid field maintenance and production testing of servo systems by technician personnel using no additional instrumentation.

You can see the transient response of loop under test on a 3-in. cathode-ray screen, viewed through a mask on which has been drawn the response specified by manufacturerer. You adjust servo loop to match the two traces; if this is not possible, the loop is declared inoperative and returned to a laboratory area or maintenance department for repairs.

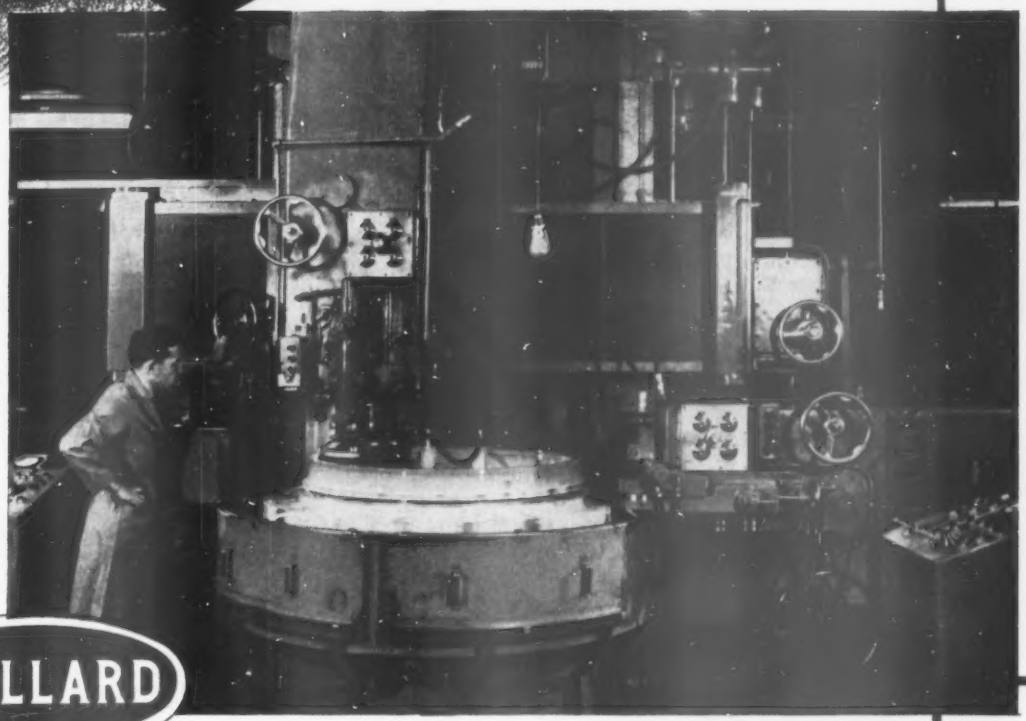
You can use unit with d-c and carrier-frequency servos. It operates on 117 volts, 60 or 400 cycles.

Industrial Control Co., Wyandanch, L. I., N. Y.

■

CLOGGING OF SEPTIC TANKS can be eliminated by Fermex, which reduces organic waste material to a liquid by a continuous fermentation process. One applica-

NOW VERTICAL CHUCKING Grinders BY BULLARD



BULLARD

Bullard presents a carefully engineered and developed Vertical Chucking Grinding Machine in a range of sizes to meet present day requirements for conveniently grinding the larger sizes of work.

Years of study of field requirements for a truly accurate machine of this kind have produced this Vertical Chucking Grinding Machine now in production at the plant of TIMKEN BEARING CO. Canton, Ohio.

It is designed and built with Bullard characteristic Vertical Turret Lathe ruggedness and rigidity, combined with the sensitivity of control and built in precision so essential for successful grinding results.

Precision, flexibility of control, safety design and productive efficiency place THIS LINE OF VERTICAL CHUCKING GRINDING MACHINES as an IMPORTANT item on your list for immediate investigation.

Write now for Delivery dates and complete information, ask for VG-6S.

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

THOMAS
Flexible ALL METAL COUPLINGS
FOR POWER TRANSMISSION
REQUIRE NO MAINTENANCE

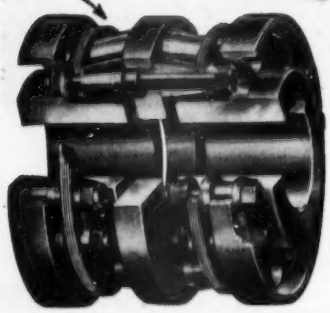
Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
1 to 30,000 RPM

Specialists on Couplings for more than 30 years

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated
Lubrication is not required!

PATENTED FLEXIBLE DISCS



THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.
NO MAINTENANCE PROBLEMS.
ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 158

tion per year gives your septic tanks trouble-free operation, prevents clogging, and eliminates the need and expense of pumping out tanks. Fermex does not affect metal pipes, porcelain, or cement block. Made by Fermex Co., 11 Hill St., Newark 2, N. J.

■

Generator-Motor Cleaner

You submerge motor in Shaler Generator-Motor Cleaner and run it for 3 to 5 minutes. Then remove it from dip tank and dry it with compressed air. Or you can spray the solvent into intake side of motor while it is in operation. Solvent does not affect wiring or insulation. Listed under Re-examination Service of UL.

Shaler Co., Waupun, Wis.

■

LOW-COST FLEXIBLE TUBING has wide range of industrial uses. Called Flexflyte Green Label, it resists flames, oils, gases, acids, alkalis, and abrasion. Made in 1- to 2½-in. diameters in ½-in. increments by Flexible Tubing Corp., Guilford, Conn.

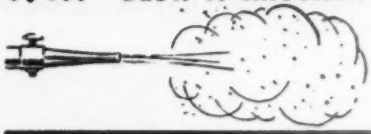
CORRECTION

The address of Sorrell Mfg. Co., manufacturers of a pocket-size bolt and nut gage announced on p. 186, January FACTORY, is 15017 Detroit Ave., Lakewood 7, Ohio (not Illinois, as stated in the accompanying description).

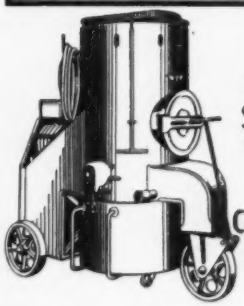
Turn the page

WHY SWEEP IT?

WHY BLOW IT AROUND?



REMOVE IT ONCE AND FOR ALL WITH HOFFMAN HEAVY-DUTY Vacuum Cleaning



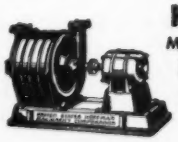
FREE SURVEY Shows How Your Plant Can Cut Costs—Speed Production

Hoffman equipment saves on plant maintenance, spurs production by removing dust and dirt in one operation... no re-handling! Fast, flexible cleaning that goes anywhere—floors, walls, overhead areas, in and around equipment (also while plant is operating). Recovers valuable material—removes fire and explosion dust hazards—boosts employee morale.

Hoffman "Hoffco-Vac" portables are built for rigorous industrial cleaning. Four sizes: 1½, 3, 5 and 7 H.P. models. Also, a 5 H.P. gasoline operated model. Write for Bulletins.

STATIONARY SYSTEMS for cleaning in several locations at one time, at a moment's notice. Permanent piping throughout plant conveys dust pneumatically to central point for easy disposal. Designed to your requirements by Hoffman engineers. Write for Bulletins.

For Lifetime Efficiency—Low Power Cost



HOFFMAN
Multistage Centrifugal
BLOWERS and EXHAUSTERS
Write for Bulletin A-650

Pressures: 1 to 8 P.S.I. Volumes: up to 7,500 C.F.M. Comparable at Vacuum.

U. S. HOFFMAN
MACHINERY CORPORATION
AIR APPLIANCE DIVISION
102 EAST 12TH ST., NEW YORK 3, N.Y.
CANADIAN PLANT: NEWMARKET, ONT.

Your Honeywell instrument service starts here . . .

THOROUGH TRAINING is the foundation of Honeywell instrument service. In classrooms and in the Honeywell factories, hand-picked men first are schooled in both the theory and practical art of keeping good instruments in the best condition.

Then they serve an apprenticeship in field work . . . learning still more through first-hand experience. The Honeywell service man who comes to your plant is a full-fledged specialist, well equipped to render the service you need . . . and that your Honeywell instruments deserve.

These men are part of the world's largest instrument service organization. They're at your call in more than 110 Honeywell offices, located near every major production center from coast to coast.

When trouble occurs, just pick up your phone and one of them will get to your plant promptly . . . within a few hours. But to prevent troubles before they start, investigate Periodic Instrument Service . . . an economical plan that assures your instruments of regular check-ups by a capable service man.

Honeywell's service school training is also available, at no charge, to employees of customers.

Your nearest Honeywell office will gladly give you full details about Honeywell instruments, controls . . . and service.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4461 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

How much does materials handling add to your production costs? Along assembly lines? Around machine tools? On loading platforms? In and out of storage? Handling materials is the largest single cost item in most plants. Start licking it now!

Thousands of plants have found the answer to efficient movement of materials with this quick, effortless, low cost way — "thru-the-air" with P&H Hevi-Lift Hoists.

You merely press buttons to whisk loads from one station to another — no strain on skilled hands, no floor congestion, no costly delays. With P&H's full magnetic push-button control, you can also have variable speed where needed.

P&H Hoist Engineers have helped solve hundreds of problems like yours. They can show you how to save money — in the places where most money *can* be saved.

CALL YOUR P&H HOIST DEALER

Or write us for Bulletin H-20.

P&H HOIST DIVISION

HARNISCHFEGER

CORPORATION

MILWAUKEE 46, WISCONSIN

the P&H *line*

TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PRE-FABRICATED HOMES · ELECTRIC HOISTS · 50% STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

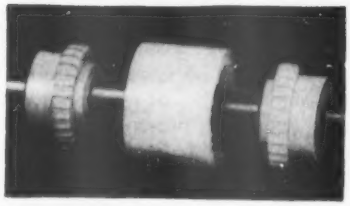
AUXILIARY EQUIPMENT

For Dehydrating and Filtering Plant Air

This unit gives you 30 scfm. at 100 psig. of instrument quality compressed air. Called Model B-30-D Condensifilter, it features a filtering cartridge of wire mesh and flannel with a radial fin design that provides over 540 square inches of filtering area. Entire cartridge can be quickly replaced to keep maintenance time at a minimum. Air passes over 400 square inches of condenser area.

Hankison Corp., 168 Biltmore Bldg., 951 Banksville Rd., Pittsburgh 16.

■



Lightweight Gear Coupling

Here's an inexpensive gear coupling for your smallest fractional horsepower drives. You can get it for ⅜-, ½-, ⅝-, and ¾-in. hub bores, and it weighs about 2¼ ounces.

Coupling is made of smooth, tough nylon that withstands corrosion and is not affected by most liquids and gases.

Named the Waldron Junior Coupling, unit has been tested safely to over 1100 inch-pounds torque. Hubs have 2 set-screws spaced 120 degrees apart.

John Waldron Corp., New Brunswick, N. J.

■

Air Volume Amplifier

Enables you to convert a loading or signal pressure to a high-volume output pressure equal to the loading pressure within less than 1%. Unit is designed to speed up and eliminate lag in pneumatic control circuits, air valve motors, and air cylinders. Less than 1 cubic inch of air is needed from the signal source to completely open booster's supply valve, which will pass more than 35 cfm. of free air with 90 psi. supply.

Kendall Controls Corp., 144 Moody St., Waltham 54, Mass.

■

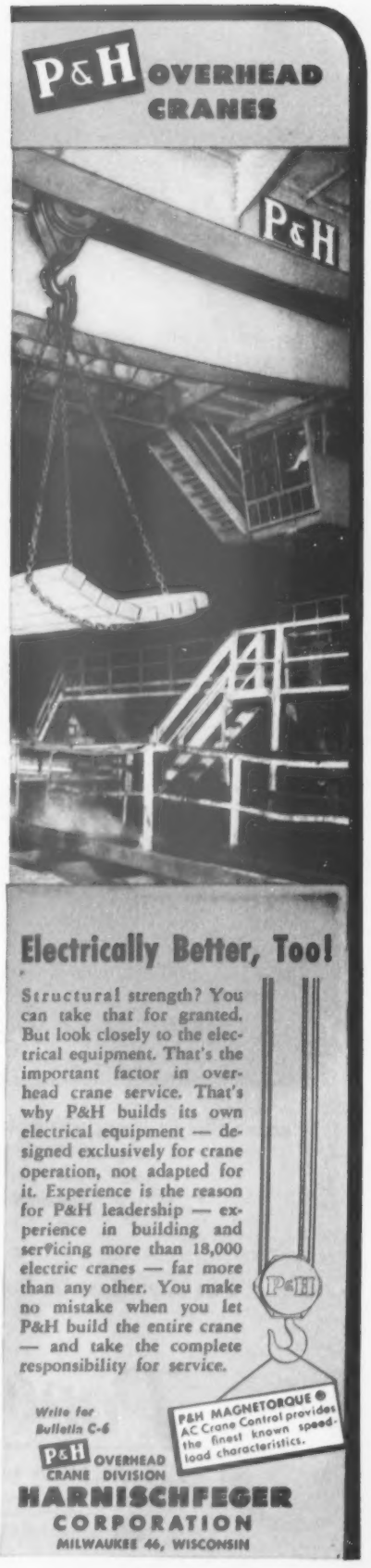
Ultraviolet Source for Air Conditioning Systems

You can install high-intensity unit in air ducts where it exposes circulating air to powerful ultraviolet radiations.

The lamp, called Hanovia Safe-T-Aire, can be installed in multiples as well as singly to sterilize any volume of air from room size to entire plant.

Hanovia Chemical & Mfg. Co., 100 Chestnut St., Newark, N. J.

Turn the page


P&H OVERHEAD CRANES
P&H
Electrically Better, Too!
Structural strength? You can take that for granted. But look closely to the electrical equipment. That's the important factor in overhead crane service. That's why P&H builds its own electrical equipment — designed exclusively for crane operation, not adapted for it. Experience is the reason for P&H leadership — experience in building and servicing more than 18,000 electric cranes — far more than any other. You make no mistake when you let P&H build the entire crane — and take the complete responsibility for service.
P&H MAGNETORQUE® AC Crane Control provides the finest known speed-load characteristics.
Write for Bulletin C-6
P&H OVERHEAD CRANE DIVISION
HARNISCHFEGER CORPORATION
MILWAUKEE 46, WISCONSIN

No Snag

with PUNCH-LOK Hose Clamps

There are no bolts or other projections to catch or snag, because PUNCH-LOK's double-wrapped steel band and lock are flush with the surface of the hose. Uniform clamping action compresses the hose evenly all around the fitting to secure a leakproof connection as strong as—or stronger than—the hose itself.

"The Sign of a Good Hose Clamp"

See Your Near-by Punch-Lok Distributor

Punch-Lok COMPANY

321 North Justine Street, Chicago 7, Illinois

NEW AUXILIARY EQUIPMENT

Begins on page 163

Portable High-Pressure Greasing Unit

The new 6-V Greasemaster obtains its power from conventional 6- or 12-volt vehicle batteries and weighs less than 40 pounds.

Unit has 25 feet of hose rated at 3000 psi., and 10 feet of connecting cable. An automatic pressure switch enables you to use Greasemaster's universal pressure gun speedily and efficiently for positive lubrication on all types of equipment.

G & T Industries, Inc., 1428 Barwise, Wichita, Kan.

■

Wire-Braided Steam Hose

Ironsides Steam Hose combines wire-braided and glass cord construction for rugged use in steel mills finishing work, refineries, and all types of steam cleaning.

Inner braids of wire give hose working pressures up to 200 pounds and glass cord outer braid provides additional strength, as well as a higher degree of insulation. Both the tube and cover are made of heavy-gage Ebonite heat-resistant compound. Sizes range from ½- to 1¼-in. I.D.

Quaker Rubber Div., H. K. Porter Co., Inc., Tacony & Comly Sts., Philadelphia 24.

Turn the page

You Spent at least $6,000 to create his job... will you spend $2.30 to Protect it?

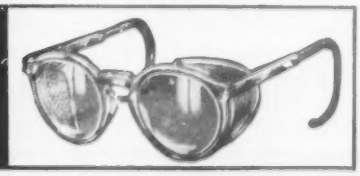
Eye Accidents Cost $176,000,000 a year in LOST MAN-HOURS alone*

To give a skilled worker the tools and machines to produce, industry invests $6,000 or more per job. If you lose his skill due to an industrial eye accident, you tie up your $6,000 completely if he has no adequate substitute. You lose the production his tools turn out. And if his is a critical "bottleneck" operation, you may tie up entire plant output.

Even a production *slowdown* is grim business in these days of high break even points. Why risk it because of a costly eye accident, when the average cost of a pair of safety goggles that can prevent his eye accident is only $2.30? Call your nearest AO Branch Office and learn how an AO Eye Protection Program can save money well into four figures annually.

*Estimate. Industrial eye injuries cost over $5 per employed worker per year — with compensation averaging nearly $400 per injured man.

American Optical Company
SAFETY PRODUCTS DIVISION



Write American Optical Company, 532 Vision Park, for free booklet "Improved Industrial Vision" telling how AO's Industrial Vision Program cuts costs, increases production, decreases accidents.

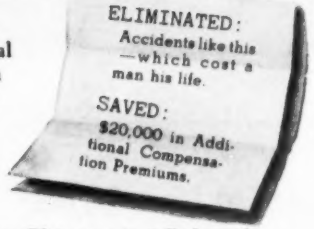
SOUTHBRIDGE, MASSACHUSETTS

BRANCHES IN PRINCIPAL CITIES

. . . THEN WE INSTALLED ALGRIP

And Ended Slipping Accidents And High Insurance Costs!

It happened at a large industrial plant, where oil and grease on a loading platform created a constant hazard. A lift truck skidded on the slippery surface, toppled from the platform's edge, and crushed the operator to death.



Then A.W. ALGRIP Abrasive Rolled Steel Floor Plate was installed on the platform—and slipping accidents ended at once. For ALGRIP is truly non-slip—even on steep inclines! Hundreds of tiny abrasive particles in each square foot of ALGRIP converted the slippery, dangerous platform into a hard gripping, anti-skid surface—safe for men and vehicles alike.

IMMEDIATE SAVINGS were obtained in three ways: (*1*) *No more costly, morale shattering accidents.* (*2*) *Faster handling of loads.* (*3*) *Workmen's compensation insurance premiums were substantially reduced by more than enough to pay for the* ALGRIP *installation.*

END SLIPPING ACCIDENTS THAT STEAL PRODUCTION AND KITE INSURANCE RATES

A.W. ALGRIP—only abrasive rolled steel floor plate in the world—pays for itself in savings from safety. Tough abrasive particles (same kind used in grinding wheels) put hundreds of tiny safety-brakes in every footstep—make it virtually impossible to slip even on steep inclines. ALGRIP doesn't wear smooth either—wear only exposes new particles. And tough rolled steel makes this floor plate stronger than other abrasive floorings. For safety at a saving, get the full ALGRIP story today. Write for our new Booklet AL-30—without obligation.

Over 125 Years of Iron and Steel Making Experience.

ALGRIP Abrasive Rolled Steel Floor Plate

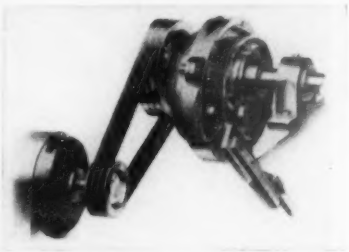
ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

Other Products: A. W. SUPER-DIAMOND Floor Plate • Plates • Sheet • Strip (Alloy and Special Grades)

NEW AUXILIARY EQUIPMENT

Begins on page 163



Shaft-Mounted Speed-Reduction Drive

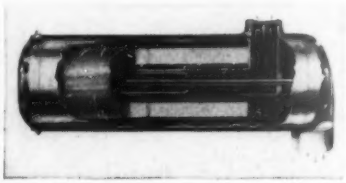
The new "Shaft-King" unit has a 20:1 ratio speed-reduction and features two trains of single-helical-type gears. Unit is built with both ball and tapered-roller bearings.

Gears and bearings are continuously splash-lubricated by high-speed gear and counter-shaft pinion which run in a large oil reservoir.

You can use unit on any shaft size up through 3 15/16 inches.

The American Pulley Co., 4200 Wissahicken Ave., Philadelphia.

■



Micronic Filter for Hydraulic Systems

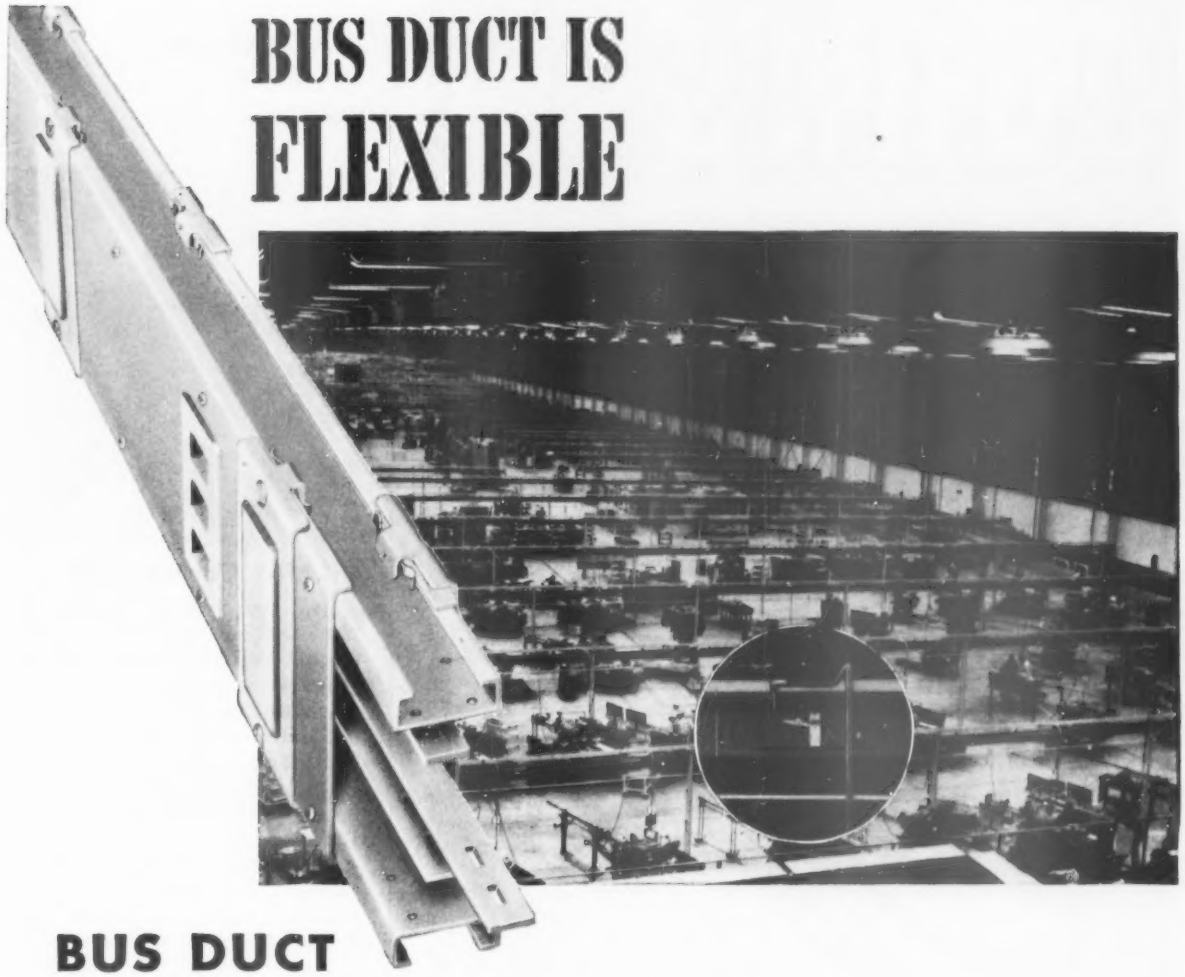
You mount unit within oil tank or reservoir, with removable head exposed. A built-in shut-off valve permits you to replace filter without draining tank. Unit may also be mounted externally.

Tests with a 25-micron filter on 210 SUS oil at 90F. indicate a flow rate of 24 gpm. with pressure drop of 1 psi. Length is 25½ inches over-all, and diameter is 8 inches. Inlet and outlet connections are 2-in. female ips.

Rucker Mfg. Co., 4516 Hollis St., Oakland 8, Calif.

Turn the page

BUS DUCT IS FLEXIBLE



BUS DUCT solves high bay distribution problem

Mounting on angle iron standards proves highly flexible

An extremely high bay created a serious secondary power distribution problem at the Tulsa Plant of the Douglas Aircraft Company.

Douglas solved the problem uniquely, by mounting 4,600 feet of 400 ampere, 3-wire, 3-phase, Westinghouse Plug-In Bus Duct from angle iron standards resting on the floor. Unequaled plant layout flexibility resulted.

All Bus Duct runs are convenient to machines and exposed to view. They're mounted high enough to be out of the way, but low enough to plug in or service easily. (See circle inset.) No material is wasted with long, unnecessary lead-ins to machines; no time is lost checking circuit feeds. Machines can be shifted without affecting Duct.

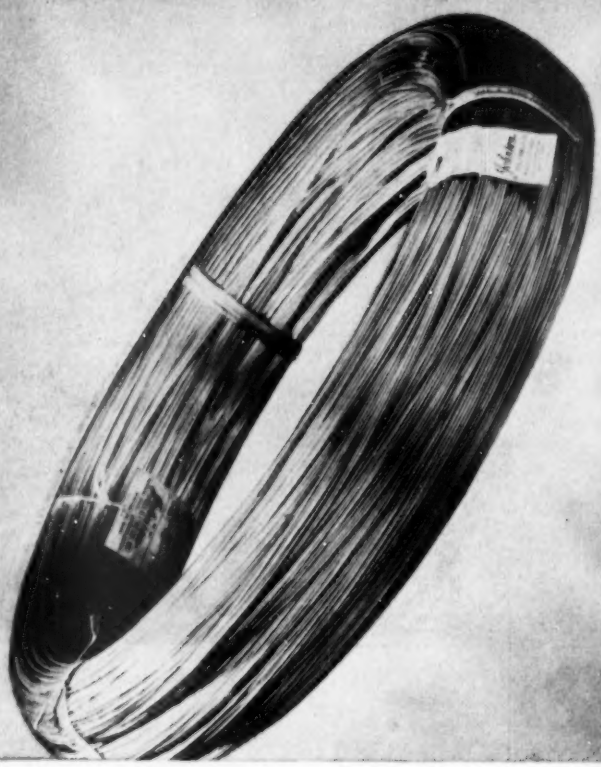
Perhaps this manner of Bus Duct installation can be applied to solve a similar problem in your plant or building. Four types of Westinghouse Bus Duct are available for any service demand up to 5,000 amperes.

Get complete details from your Westinghouse Representative or write for B-5835-A, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Penna.

J-30111-A

YOU CAN BE SURE...IF IT'S Westinghouse BUS DUCT

JOHNSON



High Quality High Carbon Wires

When the second man appeared on earth, the rights of the first were cut in half. Now divide yourself by the total population and that explains everything.

We do not claim the know-all of the wire making business, but we have been associated long with the men of this great wire making center*—and from many of these wire men have come suggestions that have led to improvements in manufacture all the way from rod to finished product.

*Worcester is the cradle of the American wire drawing industry.

JOHNSON STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

SUBSIDIARY OF PITTSBURGH STEEL COMPANY

NEW AUXILIARY EQUIPMENT

Begins on page 163

Oil Mist Control Unit

You can recover coolant oil from the mist and smoke generated by high-speed cutting, grinding, milling, and similar machining operations with the Precipitron Oil Mist Control Unit. Two models are available: PO-6 has an air-handling capacity of 600 cfm.; PO-12 can handle 1200 cfm.

Fan motors are 3-phase, fractional horsepower, ball bearing, pre-lubricated, and totally enclosed. They operate on 220 or 440 volts. Power pack operates from a single-phase, 115-volt line and consumes less than 60 watts when operating.

Westinghouse Sturtevant Div., Dept. T-509, 200 Readville St., Hyde Park, Boston 36.

■

Compact Air Cylinders

The T-J Spacemaker air cylinders save space with a new design that eliminates tie rods and reduces head size, without sacrificing cylinder strength.

Solid steel heads and heavy-wall seamless steel body give added strength and an extra-high safety factor. Cylinder walls are precision honed and hard-chrome plated. Cup-type packings, of proven sealing ability, are standard equipment.

Tomkins-Johnson Co., Jackson, Mich.

Turn the page

School Daze!

Just because that bathing suit is proper at the beach, she shouldn't assume it's proper for the classroom, too!

And just because one bearing is best lubricated by one particular grade of oil, you shouldn't assume that the same oil is best for *all* bearings on that machine. In many cases it isn't.

OIL CUPS permit you to lubricate each bearing with the oil best suited to that bearing—thus prolonging bearing life, reducing maintenance costs, cutting down-time, boosting production. And oil cups fortunately *cost very little.*

Gits oil cups have been the standard for industry for more than 40 years. Gits Bros. has the largest selection of oil cups available anywhere. Call on Gits Bros. for a prompt, efficient solution to your lubrication problems.

Write for free Catalog No. 60-A

GITS BROS. MFG. CO.

1831 S. Kilbourn Ave. • Chicago 23, Illinois

Largest

PLASTICS

supply house in America

guarantees you

IMMEDIATE DELIVERY

Our facilities for warehousing enables us to supply you with plastics for all your needs . . . quickly, economically! 1st and 2nd grade inventories and prices upon request.

Whatever your requirements

- PLEXIGLAS
- VINYLITE
- LUCITE
- ACETATE

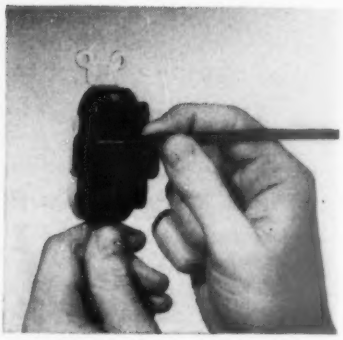
We can furnish them

cadillac plastic company

15111 SECOND BLVD., Detroit 3, Michigan
Chicago Warehouse: 806 W. Jackson Blvd.

WHAT'S NEW IN EQUIPMENT
Begins on page 156

ELECTRICAL EQUIPMENT



For a Quick, Easy Connection

Internal pressure-lock terminals take the place of binding screws in this flush-mounted wall switch or outlet. You just push stripped conductor leads into terminal holes in the back of unit. The pressure-lock holds the entire stripped length of the lead against a contact plate with a grip that will withstand a pull-out test of over 75 pounds for No. 14 Awg. wire. And you get equally firm connections with No. 10 and No. 12 wires.

Outlet is rated at 15 amperes, 25 volts and 10 amperes, 250 volts. Switch is T-rated at 10 amperes, 25 volts and 5 amperes, 250 volts.

General Electric Co., 570 Lexington Ave., New York 22.

■

Overload Relay

The new Type C Silic-O-Netic Overload Relay combines extremely high-speed operation under dangerous conditions with time delay for starting in-rush.

Unit provides definite high-speed response point at 8 times rating and protects your hermetically sealed motors, elec-

Quality

CANNOT BE ARGUED INTO A GEAR!

"ILLINOIS GEAR" BUILDS IT IN . . .

A gear is right or a gear is wrong. There will be no argument — there will be no compromise with quality when you specify Illinois Gears.

ILLINOIS GEARS Reg. U.S. Pat. Off.

Gears for Every Purpose ... **one gear or 10,000 or more**

ILLINOIS GEAR & MACHINE COMPANY

2136 N. NATCHEZ AVE. • CHICAGO 35, ILLINOIS

Sure Fire Killer!

"Automatic" SPRAY Sprinkler

UL LISTED AND FM APPROVED

YOU should specify "Automatic" SPRAY Sprinklers for your new building now in the planning stage or an old one, soon to be renovated. For here is a completely new fire fighting device that provides far superior protection than can conventional approved sprinklers. They're recognized as preferred for installation in all types of occupancies . . . both concealed and exposed piping systems. Yet, "Automatic" SPRAY Sprinklers cost no more than old style heads.

Ask any fire insurance underwriter about "Automatic" SPRAY Sprinklers, the "sure fire killer." He knows the facts of fire and what's needed for maximum safety.

You can afford no less than the best. Get "Automatic" Sprinkler . . . . FIRST IN FIRE PROTECTION.

"AUTOMATIC" SPRINKLER
CORPORATION OF AMERICA

Offices in principal cities of
North and South America

New literature available on request

"Automatic" Sprinkler

CORPORATION OF AMERICA · YOUNGSTOWN, OHIO

NEW ELECTRICAL EQUIPMENT

Begins on page 170

tronic circuits, and control systems. Features a movable iron core that operates in a tube filled with a silicone liquid. Magnetic force draws core into field at a rate controlled by viscosity of silicones, thus providing a time delay.

Relay is insulated for 440-volt service with coil ratings from 1 to 100 amperes.

Heinemann Electric Co., 315 Plum St., Trenton 2, N. J.

■

7.5 KVAR Capacitor for Secondary Networks

This unit is specifically designed for economical application to network systems rated 208 and 216 volts. And it is built to be operated in ambient temperatures as high as 131F.

You can install unit on vault wall above transformers and other equipment, or on the ceiling or floor. Its light weight—less than 75 pounds—permits easy installation without special handling equipment or removal of vault slabs.

And you can get hangers for 6 units designed for the placement of capacitors above transformers on vault wall or on cover of transformer. Unit has standard IF case and protective outdoor paint finish.

General Electric Co., Schenectady 5, N. Y.

Turn the page

Providing the sinews to bite through steel

Transmitting power to shear through steel pipe requires a drive of rugged strength. The Foote Bros. Hygrade Worm Gear Drive selected for this service provides the maximum in quality and high efficiency due to advanced engineering — improved design — new techniques in manufacture and better control of material.

Whatever your requirements in enclosed gear drives, you will find one just suited to your needs in the complete Foote Bros. line. A size and type of drive for every need.

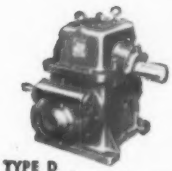
Crop End Saw built by The Enterprise Company, Columbiana, Ohio, for National Tube Division of United States Steel Company.

HYGRADE A COMPLETE FAMILY OF ENCLOSED DRIVES

TYPE S
Horizontal right angle worm gear drive. Ratios up to 71 to 1. Cap. up to 266 h.p.

TYPE X
Right angle helical — worm gear drive. Ratios up to 196 to 1. Cap. up to 71 h.p.

TYPE V
Vertical right angle drive, output shaft up, down, or both. Ratios up to 4108 to 1. Cap. up to 216 h.p.



TYPE D
Horizontal double worm gear drive. Ratios up to 4108 to 1. Output torque to 253,000 in. pounds.

TYPE VW
Hytop vertical right angle drive for long, unsupported output shaft extensions. Same ratio and capacity range as TYPE V.

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. I, 4545 South Western Boulevard, Chicago 9, Illinois

Please send me Bulletin HGB on FOOTE BROS. Hygrade Worm Gear Drives.

Name.....

Company.....

Position.....

Address.....

City..... Zone..... State.....

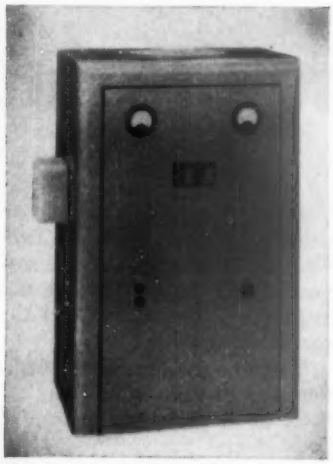
ARRO — the *complete* line of quality anchoring and drilling devices for masonry.

See your industrial, hardware or electrical supplier

ARRO EXPANSION BOLT COMPANY
1420 BOONE AVE., MARION, OHIO

NEW ELECTRICAL EQUIPMENT

Begins on page 170



Precise, High-Power D-C Source

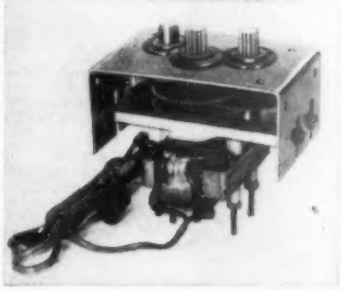
This magnetic amplifier-selenium rectifier power supply gives you highly precise high-power direct current that meets the exacting requirements of your digital and analog computers, business machines, and other complex electronic devices.

Known as the Precision Power Supply, the unit gives trouble-free service, has no moving parts or electronic power tubes.

Standard ratings range from 6- to 500-volt d-c, and from 5 to 200 amperes.

Inet, Inc., 8655 S. Main St., Los Angeles 3.

■



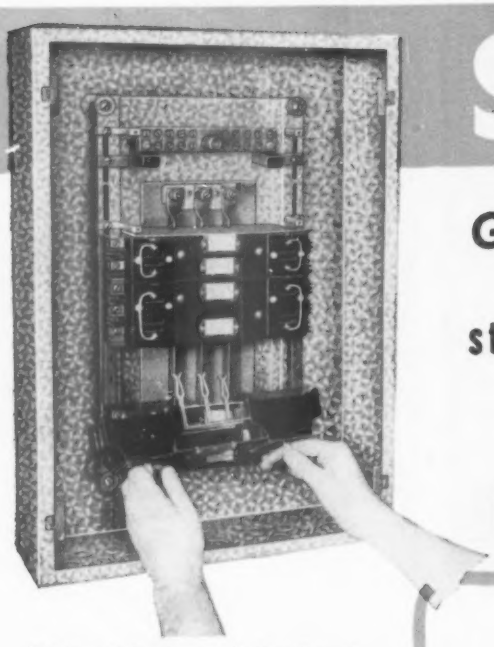
Midget Motor

Utility comes in a small package with the Kasson Roto-Sho electric motor. Gear can be sup-

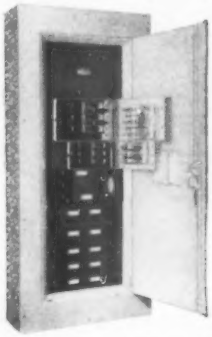
SAVE TIME . . . LABOR

Get faster deliveries with standardized FA interchangeable

PLUG-IN FEEDER PANELBOARDS



Pulfuzswitch Type of Panelboard with 30 ampere, 2 and 3 pole branches. Box is 19½" wide and 4¾" deep.



Panelboard illustrated is a combination of Pulfuzswitch and Klampswitchfuz branches. Box size is 24" wide and 10" deep.

Branch Circuit capacities are as follows:

- **FA PULFUZSWITCH** 30, 60 and 100 amperes, 250 volts AC or DC; 30 and 60 amperes, 600 volts AC, 2, 3 and 4 poles.
- **FA KLAMPSWITCHFUZ** 30 to 600 amperes, 250 volts AC or DC, 2, 3 and 4 poles.
- **FA SNUFARC** 30 to 200 amperes, 600 volts AC, 2, 3 and 4 poles.
- **FA SHUTLBRAK** 30 to 1200 amperes, 250 volts AC or DC, and 600 volts AC, 2, 3 and 4 poles.

Here's a panelboard that measures up fully to the modern demand for safe, efficient, economical and dependable power and light distribution.

Built of standardized units and assembled as required for specific application, FA Interchangeable Plug-In Feeder Panelboards not only provide adequate capacity for today's needs, but are so designed that future additions of circuits and changes in capacity can be made a simple matter of adding new units.

Three dependable FA Switches — the Pulfuzswitch, Klampswitchfuz and the Snufarc — make these panelboards the finest in safety and efficiency. All types combine switch and fuse in one unit so that current is "OFF" when the fuse carrier is removed or the door opened. This makes replacement of fuses safe, quick and simple.

Boxes are standardized as to width, height and depth to meet any combination of branches or any job requirement. They are shipped from stock, thus facilitating delivery. Except for smaller sizes, all boxes have removable ends to permit drilling of conduit openings on the job. Smaller boxes have standard knockout layout in ends. Generous wiring space and ease of installation are other features.

For operating switch requirements FA Shutlbrak Type A quick make and quick break interlocking switches are available.

Want to know more about these modern panelboards? Your nearest FA representative, listed in Sweet's, will be glad to provide it.

Frank Adam Electric Co.

P. O. BOX 357 ST. LOUIS 3, MISSOURI

Our 62nd Year

Makers of BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER

McCaskey Tool Crib Control, adapted to the unique production needs of U.S. Naval Ordnance Plant, Indianapolis, pays dividends in . . . . . .

BETTER TOOL CRIB SERVICE with BIG SAVINGS in TOOLS and SUPPLIES

The Naval Ordnance Plant, Indianapolis, may be classified as a large jobbing shop developing, fabricating and assembling precision instruments. Approximately 20,000 standard tool items, together with consumable supplies and special tools, are required for normal production needs.

Six McCaskey-controlled floor cribs in addition to a large main tool stores crib provide prompt, economical tool service. They are operated under the supervision of Harold E. Evans, Head of the Tooling Division. He writes that their use of McCaskey Tool Control methods has given them:

. . . improved service at the crib windows;

. . . constant control of all tools;

. . . rapid, accurate clearance of terminating employees' tool charges;

. . . a 40% saving in procurement of standard tools and consumable supplies in first year's operation;

. . . monthly report of the cost of worn and damaged tools and miscellaneous consumable materials chargeable to each unit that is effective in holding them at a minimum;

. . . usage factor on all tool items that provides basis for reducing crib inventories;

. . . Broken or Lost Tool Report procedure that has reduced misplacement and loss of tools and makes available valuable data on reasons for breakage and for inventory and cost records.

Similar results from improved tool crib control methods can be yours, too. Investigate NOW! Mail coupon for step-by-step procedure and detailed reports from representative users.

THE McCASKEY REGISTER CO.
ALLIANCE, OHIO

Send me all the facts on McCaskey Tool Crib Control.

Name .....

Position .....

Company .....

Address FMM-2-53

McCaskey
INDUSTRIAL CONTROLS
PRODUCTION • INVENTORY
TOOLS • COSTS • PAYROLL
THE McCASKEY REGISTER CO.
ALLIANCE, OHIO
McCaskey Systems, Ltd., Galt, Canada
The McCaskey Register Co., Watford, England

NEW ELECTRICAL EQUIPMENT

Begins on page 170

plied with single or multiple shafts, to permit use of any one speed or a combination of a number of speeds from 1 to 1150 rpm.

Roto-Sho operates on 110/120-volts a-c, 50/60 cycles. Electric consumption is less than 15 watts.

You can use Roto-Sho units on valve controls, electric-control drives, remote-control devices, bell-ringing devices, and current interrupters.

General Die & Stamping Co., 262 Mott St., New York 12.

■

Versatile Tester Has 4 Ranges

The new Martindale V.A.O. Tester is a rugged instrument built to serve you both on the bench and in the field. Its compact design makes it easy for you to carry it from job to job, and the instrument housing is insulated, unbreakable, and resistant to shock and acids.

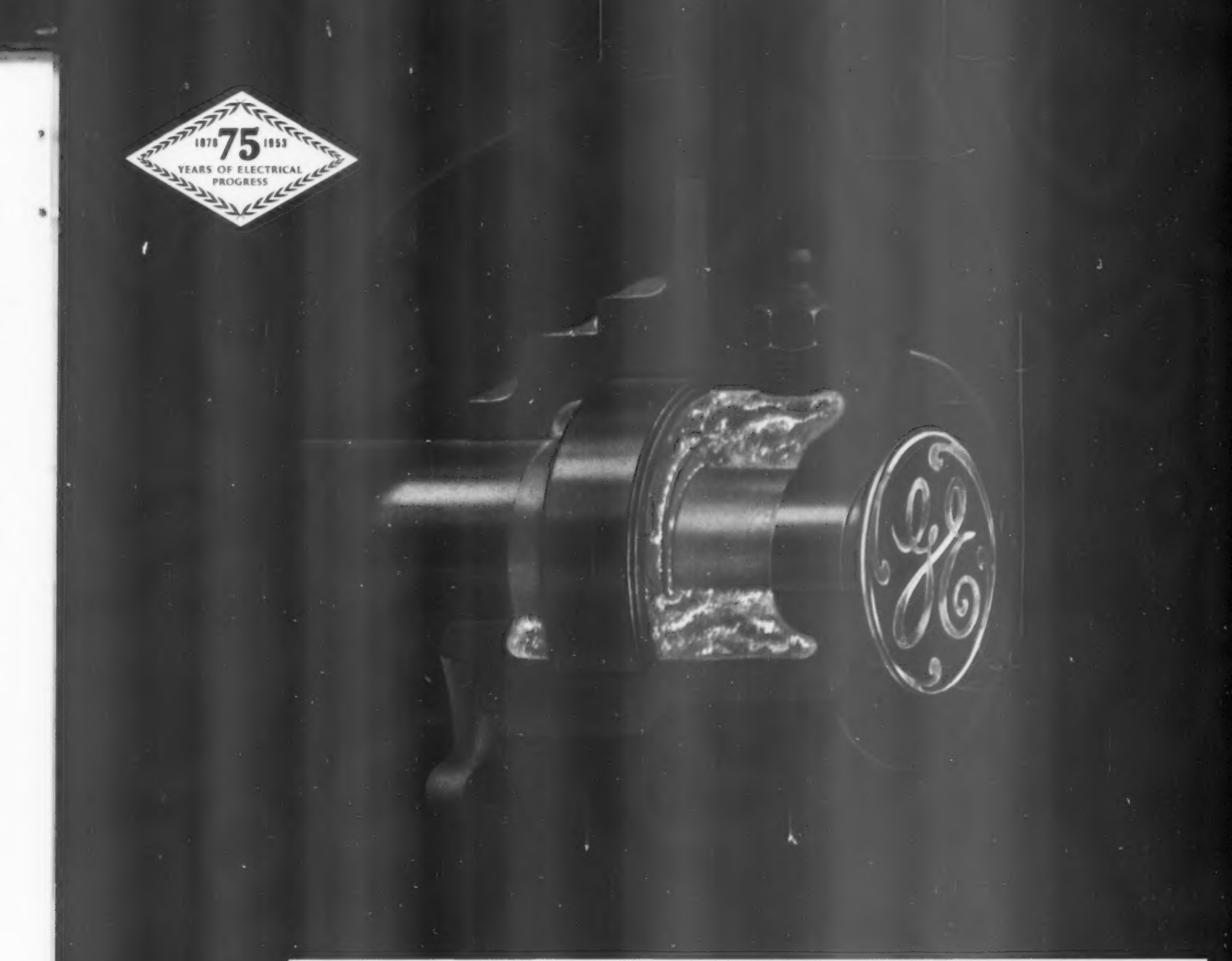
Large 5-in. meter, covered by clear, chip-proof lucite, is easy to read. And a sturdy leather handle is provided for carrying.

Selector switch (left) gives you choice of four testing ranges: volts a-c, volts d-c, ohms, and amperes. Switch at right has positions for 5 voltage ranges, 4 ohm ranges, and 1 ampere range.

Martindale Electric Co., 1393 Hird Ave., Cleveland 7.

Turn the page

1878 75 1953
YEARS OF ELECTRICAL PROGRESS



These bearings last longer than life . . . grease life

G-E TRI/CLAD MOTORS LAST LONGER

REG U.S. PAT OFF

ALL GREASE LIFE IS LIMITED. The best known greases dry out in time. This may be six months, seven years, or longer, depending on motor application.

SOME MOTORS ARE USELESS WHEN GREASE DRIES OUT. They can't be regreased, you lose production time . . . because your maintenance man is "sealed out."

BUT GREASE LIFE NEED NOT LIMIT MOTOR LIFE. Tri-Clad motors give long life without relubrication, plus provision for adding new grease when necessary.

ADDED GREASE IS USEFUL GREASE. Relubrication puts fresh grease in storage in bearing housing . . . as motor operates, grease oils migrate to bearing as needed.

TRI-CLAD MOTOR BEARING IS EASIEST TO REGREASE. Do it on the job, with motor running . . . no dismantling . . . no trip to a service shop.

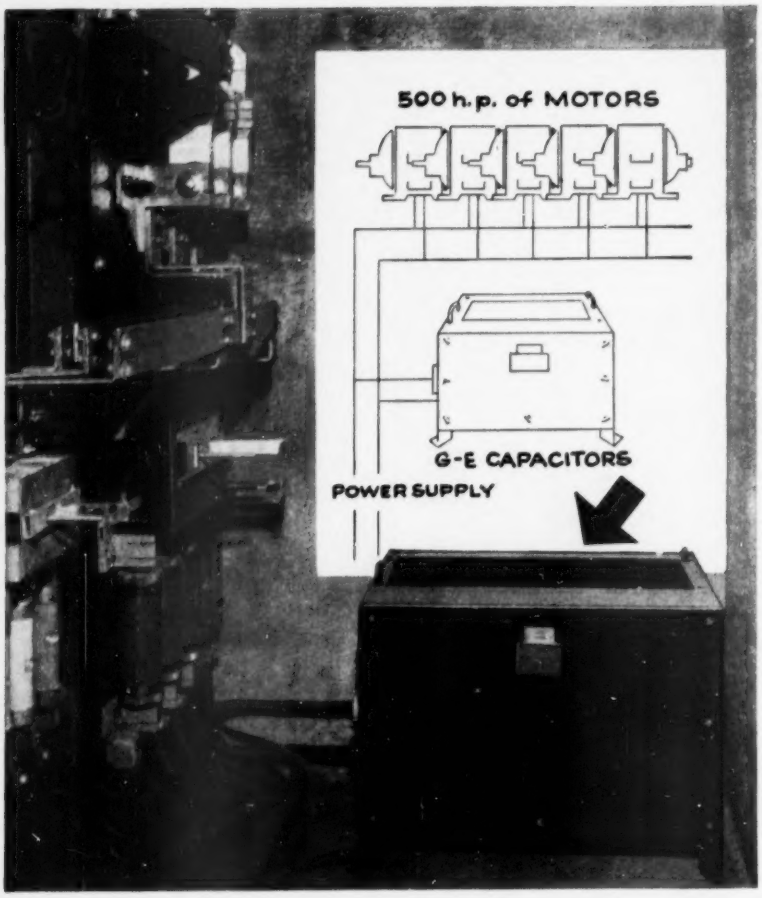
TRI-CLAD MOTOR BEARING IS BETTER PROTECTED. Completely enclosed housing has *longer seals* to keep dirt out, *larger grease supply*, and *scientific design* for continual grease migration.

THIS PRACTICAL BEARING DESIGN is one more reason why G-E Tri-Clad motors give better service . . . added life. Order through your nearby G-E Apparatus Sales Office or authorized G-E agent or distributor. General Electric Company, Schenectady 5, N. Y.

752-18

You can put your confidence in

GENERAL ELECTRIC



Low power factor was penalizing a West Coast meat packing plant until G-E engineers recommended the installation (arrow) of a 60-kvar, 3-phase 60-cycle, 460-volt G-E capacitor equipment.

$355 investment saves up to $47 every month!

WEST COAST MEAT PACKING PLANT INSTALLS GENERAL ELECTRIC CAPACITORS AND CUTS POWER COSTS

Induction motors caused low power factor. Because it takes about 500 hp of induction motors to run a plant that processes between 1500 and 2000 head of beef a day, a West Coast packing plant had a power factor that seldom got above 81%. Rebates on the plant's power bill were down to about $3 a month.

Power factor raised from 81% to 96%. Then G-E engineers recommended the installation of 60 kvar of G-E capacitors at a total cost of $355*. After the capacitors were installed the power factor rose to better than 96% and stayed there. Rebates on the power bill now average between $45 and $50 every month. Thus, in less than nine months, the company realized a saving greater than the cost of the capacitor equipment. ***And these monthly savings will go on indefinitely.***

*Cost of capacitor equipment in 1949. Prices slightly higher now.

Capacitors can help in other ways, too! Besides raising power factor, capacitors often permit your present distribution system to carry 20 to 30% more load without added equipment. Where voltage drop is a problem, capacitors can also provide the needed voltage boost inexpensively.

They're the key to lower power costs. This West Coast plant is just one of the many that are cutting power costs with capacitors. If your power factor is below 85% and if there is a power-factor or kva-demand clause in your power contract, chances are you can make similar worth-while savings. Your local G-E sales office or authorized G-E agent or distributor can help you—or write to Section 407-207 for booklet GEA-5632—"How to Use Capacitors to Reduce Power Costs and Gain System Capacity." *General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

407-207

for a few pounds of copper...
or a truckload... **Call Chase**

Need just a few lengths of seamless brass tube? We'll be glad to hand them to you "over the counter." Or if your job calls for large quantities of brass or copper sheet, rod, wire or tube, we can speed it on its way to you. That's the kind of service you can get by calling your nearest Chase warehouse.

We can supply you, subject to government controls, with hundreds of items for production, maintenance or repair. That's why it pays to "try Chase first" for anything in brass or copper.

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

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Baltimore	Denver†	Milwaukee	Pittsburgh	Waterbury
Boston	Detroit	Minneapolis	Providence	
Chicago	Houston†	Newark	Rochester†	(†sales
Cincinnati	Indianapolis	New Orleans	St. Louis	office only)

"HAZARD ELIMINATED"

Another example of

positive protection in transit

with the

STANLEY STEEL STRAPPING SYSTEM

Product lost — everything ruined was the report when the tops of pails containing an "antiquing" liquid came off during shipment from Endicott-Johnson's Chemical Dept. in Endicott, N. Y.

Simple, foolproof solution was found by banding the tops to the pails with Stanley Steel Strapping.

You'll find many ways in which the Stanley Steel Strapping System can protect shipments, speed shipments and lower costs. For example, it is a fast, economical way to prepare floating loads. It saves man hours and materials in packaging or making up unit loads . . . facilitates loading and unloading . . . prevents pilferage.

Let this expert help you. The Stanley Man is a specialist in Steel Strapping and Car Banding Systems. He'll be glad to study your materials handling methods, to suggest improvements without obligation. Just mail the coupon below. Branch offices or Representatives in 32 principal cities.

STEEL STRAPPING AND CAR BANDING SYSTEMS

STANLEY

Reg. U.S. Pat. Off.

Hardware • Tools • Electric Tools
Steel Strapping • Steel

Invite the Stanley Man to Call

The Stanley Works, Steel Strapping Division
201 Lake Street, New Britain, Conn.

Please have your Representative show me how the Stanley Steel Strapping System can speed materials handling, and lower costs.

Name _____

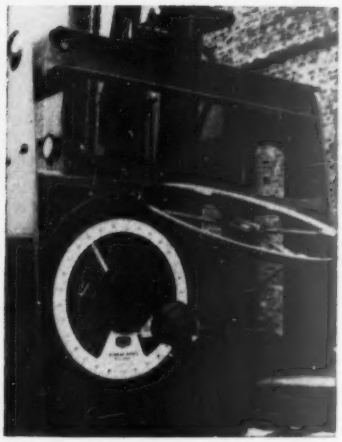
Firm Name _____

Street _____

City and State _____

WHAT'S NEW IN EQUIPMENT
Begins on page 156

MATERIALS HANDLING



Weighing Attachment for Fork Trucks

If your materials handling operations include weighing pallet loads, here's a new development to save time.

The Wheelersmith attachment enables every type of fork truck to weigh its own loads accurately It eliminates waiting time lost at scales by conventional fork trucks.

You can install weighing unit on any standard-model fork truck without alteration. The attachment can be built to fit either small or large fork trucks, and it is equally suitable for both gasoline- or electric-powered models.

You read weight on a large dial located in front of the operator's seat. A large hand knob at center of dial (shown above) enables you to tare off weight of pallet or other container, leaving the actual net load reading on the dial. Weights are indicated to fine limits of accuracy.

Wheelersmith, Ltd., c/o Ronald A. Foort, Cunard Line, 25 Broadway, New York.

Turn the page

HANDLING HELPS

by A.L.L.

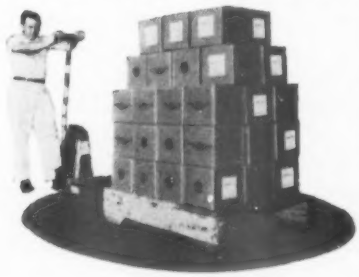
No More Muscle Men . . .

It used to take strong men to shuffle warehouse stock — now even the office boy can do the job faster and for far less money. Just get yourself an inex-

pensive Lewis-Shepard Model "J" Fork Truck to "whizz" 2000 lb. loads from place to place . . . stack 'em high with effortless ease. Incidentally, the "J" sells for about half as much as standard trucks of equal capacity. A recent check revealed that it cost just a dime (yes, I said 10c) a day to charge the "J" battery. Interested? Its other features are just as interesting — write us and see.

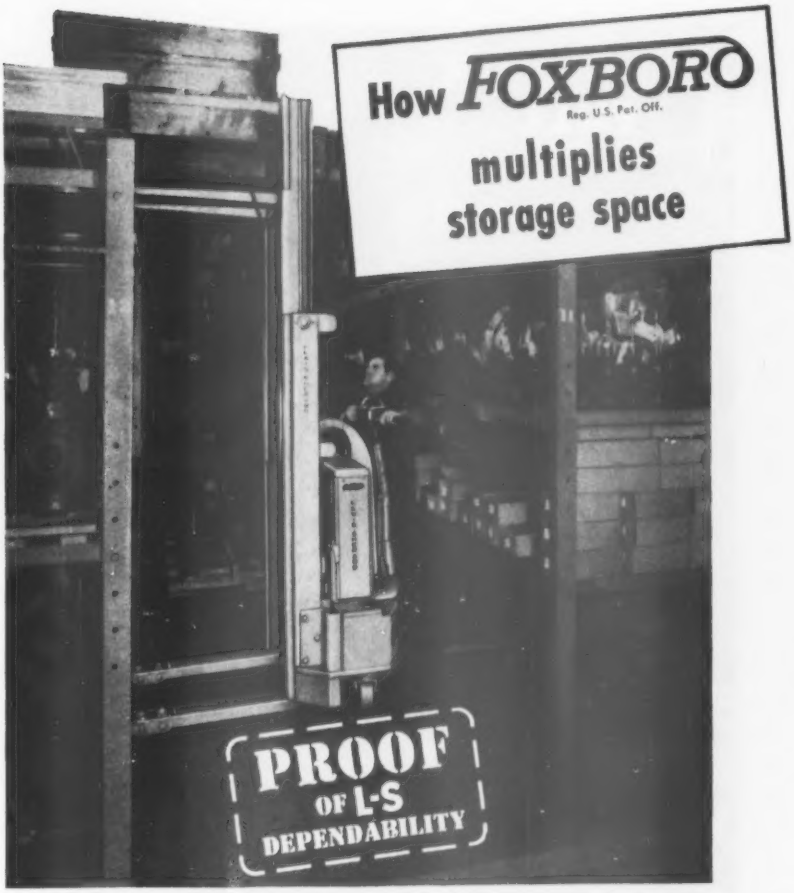
Don't Sell the Hand Lift Short!

In large and small plants alike, there'll always be a place for rugged hand lift trucks. Sometimes they meet all your needs; in other cases they supplement your electric trucks. For example, a



Lewis-Shepard JackLift stationed at shipping and elevator doors is good insurance against traffic tie-ups . . . the JackLift is on the spot to clear the way when electrics are busy elsewhere. We make JackLifts in many models with 1000 to 20,000 lb. capacities — special purpose models, too. And you can't buy better ones. May we show you some? Write *Lewis-Shepard Products, Inc., 36 Walnut St., Watertown 72, Massachusetts.*

ADV.



By reducing aisle widths to 58 inches between storage racks, The Foxboro Company, Foxboro, Mass., substantially increases storage space. Keeping materials handling efficiency high in these narrow aisles is a job for *one particular* truck — the new Lewis-Shepard Electric Jack-Stacker with capacities to 6000 lbs. Officials at Foxboro report that the Jack-Stacker was the only truck which could meet their specifications.

Take a long look at this new Jack-Stacker . . . it'll get into the tightest places with ease. And it has all the other features you'll want, too: speed with smooth acceleration, powerful brakes, simplicity of operation — all controls are in handle head, "squeeze to start . . . release to brake". Prove for yourself its greater dependability and economy — write for Catalogs, Comparison Chart and "Proof Folders".

HERE'S MORE PROOF OF LEWIS-SHEPARD WALKIE TRUCK DEPENDABILITY

Listed are some current L-S reorders from blue-chip companies in various industries:

Amusement Goods	had	74	reordered	6
Insulation Mfr.	had	1	reordered	15
Electrical Goods	had	194	reordered	14
Grocery Chain	had	73	reordered	6
Chemical Mfr.	had	14	reordered	5
Rubber Goods Mfr.	had	5	reordered	3
Carbon Mfr.	had	23	reordered	4

LEWIS-SHEPARD®

Nationwide Service — See "Trucks, Industrial" in your Yellow Phone Book

The "MASTER" Line

LEWIS-SHEPARD PRODUCTS, INC.
36 Walnut St., Watertown 72, Mass.

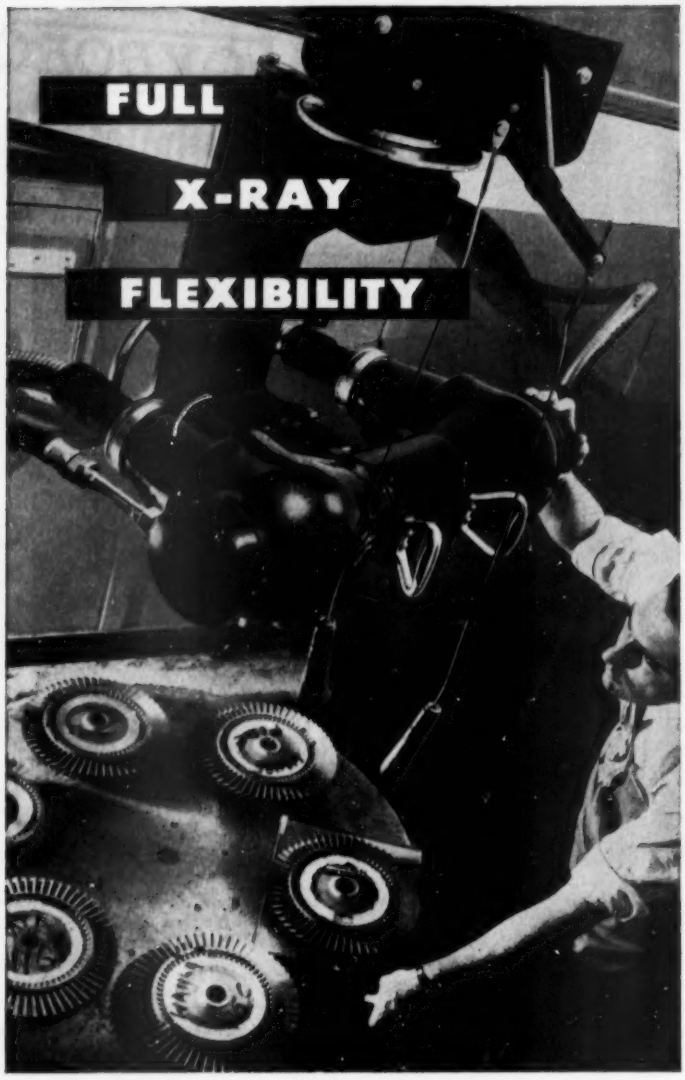
Please send me Catalogs, Comparison Chart and "Proof Folders" illustrating JackStackers at work.

Name .....

Company .....

Street .....

City ..... State .....



WESTINGHOUSE 250 KV JIB CRANE X-RAY UNIT

Curtiss-Wright uses Westinghouse X-ray equipment for nondestructive testing of vital parts of their outstanding aircraft engines. Here, they're examining critical welds on gas turbine booster rotors. Prime reason for selection of Westinghouse equipment was *flexibility*—since *flexibility* results in more radiographs per shift.

Kilovoltage on this unit varies from 30 to 250, with greater X-ray output per KV because of constant potential high voltage generator. Result: unit is capable of inspecting materials ranging from 1/8" aluminum to 4" steel.

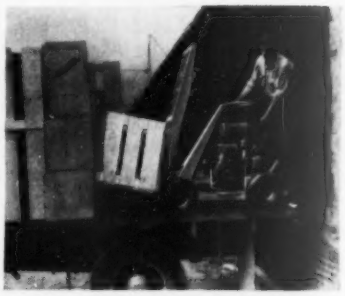
Jib crane tubestand and X-ray tubehead flexibility allows maximum ease of positioning in radiographing parts of all sizes and shapes. Result: time is saved, output is stepped up.

Call in the Westinghouse X-ray representative, or write Westinghouse Electric Corporation, Industrial X-ray Section, 2519 Wilkens Avenue, Baltimore, Maryland. J-08285

YOU CAN BE SURE...IF IT'S
Westinghouse

MATERIALS HANDLING EQUIPMENT

Begins on page 178



Versatile Gasoline-Powered Hand Truck

This materials handling vehicle gives you the convenience of a hand truck with the added utility of power and speed. Called the Expediter, the unit is powered by a 7.5-hp. Wisconsin engine and is as easy to handle as a bicycle.

The Expediter can handle loads up to 800 pounds at 12-in. load center with hydraulic or manual lifts. Its compact design enables it to operate in narrow aisles, and its light weight permits use on elevators and floors where heavy units cannot operate.

Forward and reverse drives are controlled by pressure of operator's foot on a single pedal—no gear shifting to change direction of travel. Maximum speed forward is 9 mph., in reverse 7 mph.

Kalamazoo Mfg. Co., Kalamazoo, Mich.

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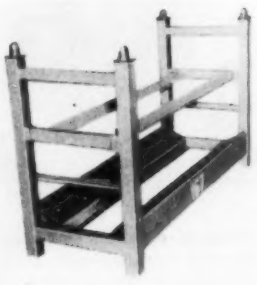


Coil Storage Rack

You can store two rows of small-diameter coils, or take out removable shelf to store large coils, in this versatile coil rack.

Turn the page

You can't stop an elephant with a sling shot

You can't stop corrosion with ordinary paints . . . it takes BITUMASTIC COATINGS!

CORROSION can't be stopped by ordinary paints or conventional protective coatings. They can't protect surfaces against the ravages of rust for any appreciable length of time. But Bitumastic Coatings can!

FIRST—Unlike maintenance paints, Bitumastic® Protective Coatings are specially formulated from a coal-tar pitch base* that is, for all practical purposes, impervious to water. When you keep moisture away from an exposed surface, you *stop* corrosion.

FURTHER—Bitumastic Coatings provide an extra-tough, extra-thick barrier against corrosive elements—a barrier that is impenetrable. These coatings provide up to 8 times the film thickness of conventional paint coatings.

FINALLY—Bitumastic Coatings stop corrosion caused by moisture—acid fumes—alkaline fumes—corrosive soil—salt air—heat. There are 6 Koppers Coatings—formulated to control corrosion of metal and deterioration of concrete. Use coupon for full information.

**Hi-Heat Gray contains a metallic base.*

SEND FOR SET OF FREE BOOKLETS!

Koppers Company, Inc., Tar Products Division
Dept. 253-T, Pittsburgh 19, Pa.

Please send me, without charge or obligation, complete information on corrosion prevention.

Name .....

Address .....

City ..... Zone ..... State .....

KOPPERS BITUMASTIC PROTECTIVE COATINGS

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

KOPPERS COMPANY, INC., Tar Products Division, Dept. 253-T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

Always SWIVEL and ROLL

Always SWIVEL and ROLL

Free Manual

DARNELL
Casters & Wheels

Can Help You Save Time and Money

Darnell Casters and Wheels start cutting costs from the very first day of installation. Easy rolling and swivelling increase employee efficiency, save floors and help add to production. With over 4000 types of casters and wheels to select from you can specify the exact model to meet your requirements.

Specify Darnell for Complete Satisfaction

DARNELL CORP., LTD.
DOWNEY, (Los Angeles County) CALIF.
60 Walker Street, New York 13, N.Y.
36 North Clinton, Chicago 6, Illinois

Begins on page 178

The center shelf rails are set at 45 degrees to prevent marking the stock. No bolts or other attaching devices are used.

Rack can be handled by fork truck and can be supplied with lifting eyes for sling and hoist. Nesting caps permit safe stacking to save your valuable floor space.

Equipment Mfg., Inc., 21550 Hoover Rd., Detroit 5.

■

Automatic Filling Scale

Here's a unit designed to tackle the problem of handling materials with high flooding characteristics, such as resins, insecticides, clay, powders, etc. The new Thayer Model 600G filling scale automatically holds, fills, checkweighs, and releases up to 6 bags of material a minute. It holds weight tolerances of ±2 ounces, or less, on any desired weight from 25 to 200 pounds.

Features of this unit are: an air-operated bag-holder, dusttight construction, shockproof leverage system that has no knife-edge pivots, and a combination gravity and rotary feeding system. For applications where both bags and drums (up to 200 pounds) are to be filled, a steel platform is available for use with scale.

Thayer Scale & Engineering Corp., E. Water St., Rockland, Mass.

Turn the page

This Tiny Tap Tells a Big Turning Story

This tiny part portrays better than words the extreme accuracy you can expect from a Monarch 10" Model EE Precision Toolmaker's Lathe. The operation detailed below was actually performed on a standard lathe which is employed primarily to turn a variety of parts for small, precision, automatic tapping and drilling machines for the user's own manufacturing operations. These master taps which he chases occasionally are needed to make a master die. This, in turn, is used to produce working taps in quantity. End use is tapping a hole in the end of surgical needles to permit holding of the suture.

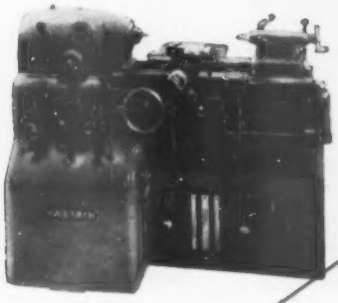
How surgeons thread the needles, we'll never know. We do know that in all probability you'll never have to work as fine as 200 threads per inch. But accuracy like this can be just as important to you, regardless. With the Monarch 10" Model EE, as a look at the listed features will at once reveal, you get a machine unequaled for precision, speed and sensitivity. Like most of the Monarch line of lathes, it can be furnished with "Air-Gage Tracer" controls . . .

The Monarch Machine Tool Company, Sidney, Ohio.

Surgical needle master tap—overall length, ¾"—diameter, .0218"—threads per inch, 200—thread accuracy, lead within .0001 over the entire threaded length of ⅜".

MONARCH 10" MODEL EE FEATURES

- All electric drive direct to spindle through multiple "V" belts. No gears in headstock.
- A true high speed lathe for small work. Available with speed range up to 40 to 4000 R.P.M.
- Totally enclosed, automatically lubricated end gearing and gear box.
- Flame hardened and ground ways for both carriage and tailstock. Bed all in one piece—no inserts.
- American standard Camlock spindle nose—for quick, rigid and accurate chuck and fixture mounting.
- Easy, fatigue-free operation. Base design permits operator to work close comfortably. He gets production—not backaches.
- Over 6000 10" Model EE machines in use.
- The only small lathe available with anti-friction bearing taper attachment.
- For thread chasing up to 100% faster, has exclusive combination of electric lead-screw reverse and variable reverse speed control.



Monarch

ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

THE MONARCH MACHINE TOOL CO., Sidney, Ohio

Gentlemen:
Please send me without obligation your complete illustrated Booklet #302, covering the 10" Model EE Monarch Sensitive Precision Toolmaker's Lathe.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

"My Choice? READY-POWER DRIVE ...Every Time!"

Ready-Power Drive is full electric drive featuring simple handling and full control, but with no limit to the hours of operation at peak efficiency. No wonder operators on incentive jobs prefer Ready-Power equipped trucks . . . they get more work done with less effort!

CONTINUOUS-DUTY POWER UNITS

Remember...Your Truck Is No Better Than Its Power!

The READY-POWER Co.

3820 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

MATERIALS HANDLING EQUIPMENT

Begins on page 178

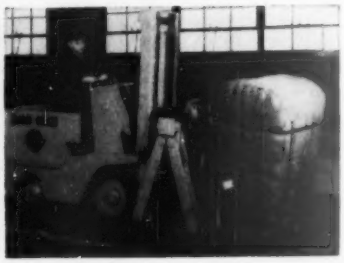
Useful, Lightweight Winch-Hoist

The versatile Lug-All is a vest-pocket hoist with dozens of uses. It weighs only 8¾ pounds yet can handle a 1½-ton load. Adds a handy muscle for pulling, lifting, moving, tightening, positioning, stretching, or straightening jobs anywhere in your plant.

Loads are backed off automatically and easily by an interlocking pawl arrangement. There are no brakes to slip. And if you overload Lug-All, the reversible safety handle will bend first, long before any other part of the hoist approaches its breaking point.

Lug-All Co., Wynnewood 16, Pa.

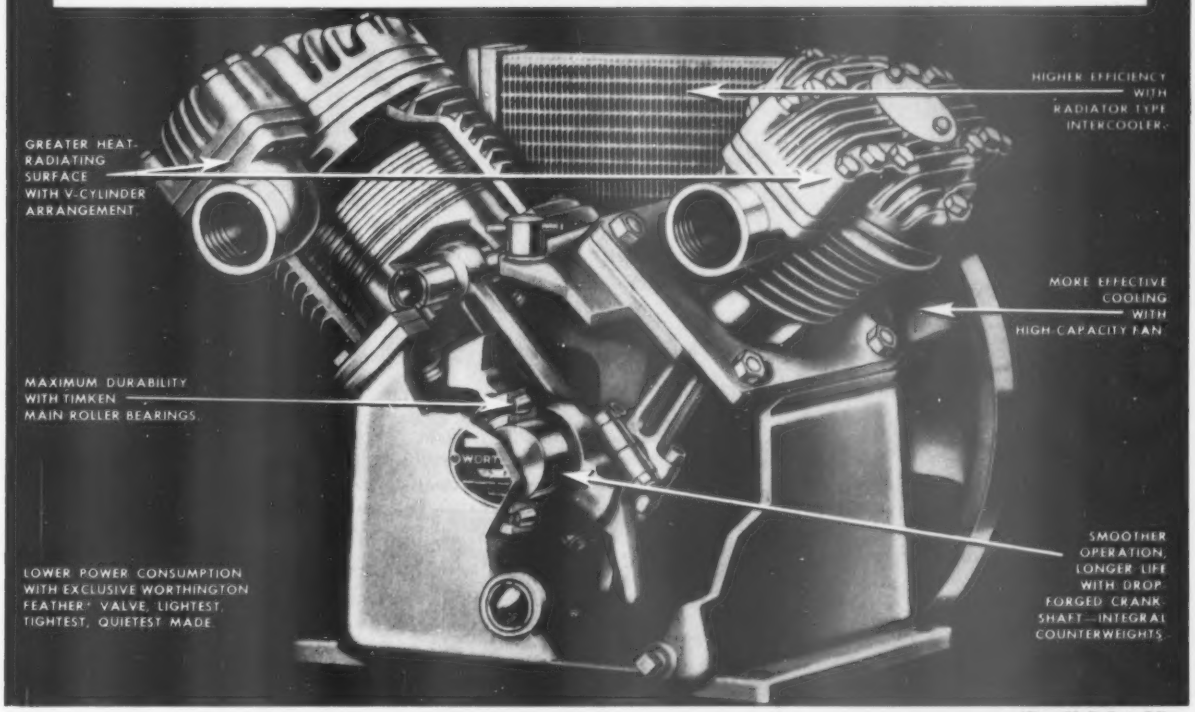
■



Load-Pusher Attachment

Here's an answer to the problem of handling bulky, unpalletized loads, such as baled scrap, paper, or textiles. This load-pusher, for Baker fork trucks with

This picture shows why "Worthington Balanced Angle" means Lowest Cost Compressed Air


GREATER HEAT-RADIATING SURFACE WITH V-CYLINDER ARRANGEMENT
HIGHER EFFICIENCY WITH RADIATOR TYPE INTERCOOLER
MORE EFFECTIVE COOLING WITH HIGH-CAPACITY FAN
MAXIMUM DURABILITY WITH TIMKEN MAIN ROLLER BEARINGS
LOWER POWER CONSUMPTION WITH EXCLUSIVE WORTHINGTON FEATHER* VALVE, LIGHTEST, TIGHTEST, QUIETEST MADE
SMOOTHER OPERATION, LONGER LIFE WITH DROP-FORGED CRANK-SHAFT—INTEGRAL COUNTERWEIGHTS

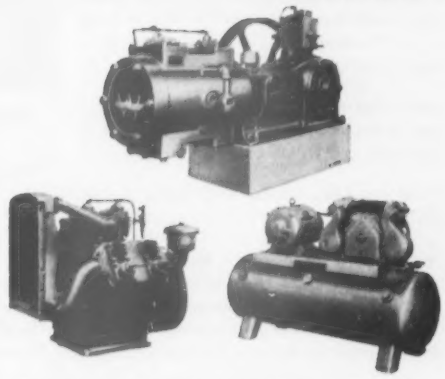
*Reg. U. S. Pat. Off.

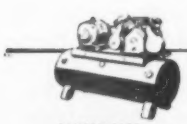
Worthington's complete line of air compressors—¼ to 100 hp—is available through distributors!

¼ to 100 hp—that's the Worthington *standard* line of air compressors! No distributor can offer you a more complete line.

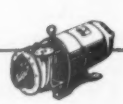
Every *Worthington* distributor can supply you with: "Balanced Angles" up to 15 hp . . . air-cooled radials 25 to 100 hp . . . water-cooled horizontals up to 100 hp.

Write for Bulletin H620-B30. Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Pump and Compressor Merchandising Division, Harrison, New Jersey. PC.2.5

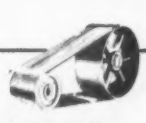




COMPRESSORS: AIR-COOLED, WATER-COOLED



PUMPS: CENTRIFUGAL, ROTARY, STEAM, POWER



MULTI-V-DRIVES: QD SHEAVES AND V-BELTS

ALLSPEED DRIVES: WORTHINGTON ALLSPEED

WORTHINGTON
Standard Compressors

Buy these Worthington standard products from your local distributor

This NEW METHOD DRIES AIR

PRECISELY as you want it

- to control your product's quality
- to prevent condensation on your product or material
- to prevent changes due to moist air in contact with your product
- to protect your material from dampness
- to protect your processing of moisture-sensitive material
- to DRY your material or product
- to pack or store your product safe from moisture damage
- to get exact moisture control for the precise atmosphere condition you need
- to provide precise atmospheric conditions for testing
- to increase your air conditioning capacity
- to DRY large quantities of fresh air from outdoors

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because . . . it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

Most reliable because . . . the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions.

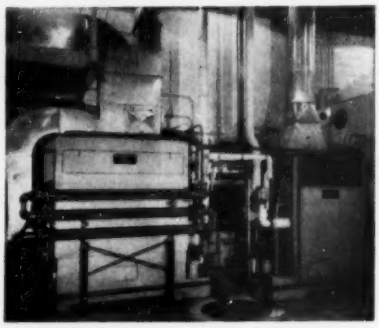
Most flexible because . . . you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because . . . the apparatus is simple, parts are accessible, controls are trustworthy.

Most compact, taking less space for installation.

Inexpensive to operate because . . . no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.



Niagara Controlled Humidity Air Conditioning

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

For complete information write

NIAGARA BLOWER COMPANY

Dept. F, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

MATERIALS HANDLING EQUIPMENT

Begins on page 178

capacities from 2000 to 6000 pounds, enables your operators to discharge loads in seconds. Also helps out when loading highway carriers unable to accommodate fork trucks because of floor load capacities or low overheads.

You get positive control over pushing pressure through a metering valve at the driver's seat.

Baker-Raulang Co., 1230 W. 80th St., Cleveland 2.

■

Speed Reducer for Conveyor Drive

This unit features an automatic and instantaneous shutoff device that eliminates need for a shear-pin coupling.

When predetermined load limit is reached, motor current is immediately cut off by direct mechanical action of the overload.

To re-start operation after overload cutoff, all you do is remove excessive load. No resetting or replacement of parts is necessary—a real time-saver on conveyor operations.

Available in wide range of horsepowers and ratios from $3\frac{5}{8}$:1 up to 6300:1.

Philadelphia Gear Works, Venango & "G" Sts., Philadelphia.

Turn the page

Kohler Greenwich lavatories in washroom of International Harvester plant, Memphis, Tenn.

Practical, durable

INDUSTRIAL WASHROOM FIXTURES

Kohler plumbing fixtures and fittings are of time-tested materials, made for heavy-duty service, economical up-keep. Their appearance and efficiency encourage cleanliness. Lustrous, glass-hard surfaces make cleaning easy.

The Greenwich vitreous china lavatory has a 6-inch back, ample basin, built-in soap dish, convenient mixer-fitting. The Daybrook drinking fountain provides a sanitary drinking mound, is adjustable for continuous flow, has a non-squirting bubbler head, automatic volume regulator. The Brooklands closet is positive-acting, sanitary.

Daybrook drinking fountain.

Brooklands closet.

Send for catalog of Kohler plumbing fixtures for industrial and public buildings.

Kohler Co., Kohler, Wisconsin. Established 1873

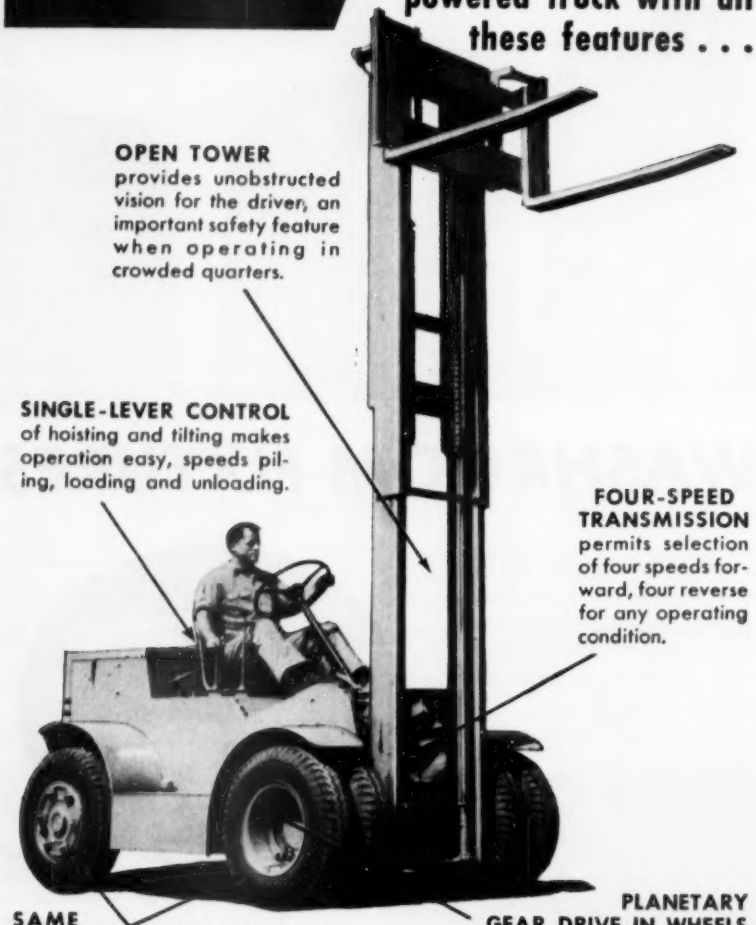
KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS • AIR-COOLED ENGINES • PRECISION CONTROLS

HERE'S THE FORK TRUCK YOU'VE BEEN NEEDING . . .

ROSS SERIES 6

the only 6,000 lb. gas-powered truck with all these features . . .



OPEN TOWER provides unobstructed vision for the driver, an important safety feature when operating in crowded quarters.

SINGLE-LEVER CONTROL of hoisting and tilting makes operation easy, speeds piling, loading and unloading.

FOUR-SPEED TRANSMISSION permits selection of four speeds forward, four reverse for any operating condition.

SAME TIRE-SIZE FRONT AND REAR permits switching tires for lengthier service, simplifies stocking of spares. 7.50-15 standard, 8.25-15 optional

PLANETARY GEAR DRIVE IN WHEELS reduces wear and tear on differential and drive axles, assures long-lived performance under adverse conditions.

For materials handling savings up to 75%, you can count on the Ross Series 6. It's engineered throughout for *all-around* top performance. Weight is balanced to achieve the best in stability and traction. It has more *live* counterweighting than any other truck of comparable size and ruggedness. It affords the best in driver-visibility. It's easy to handle, economical to operate.

When you need a fork truck in the 6,000-pound range, invest your money in a truck that's engineered for *your* needs. You'll be way ahead. For complete information on the Ross Series 6, call your nearest Ross dealer.

Rely On ROSS

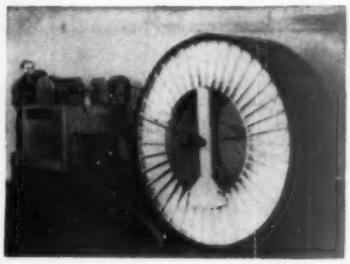
THE ROSS CARRIER COMPANY

Direct Factory Branches and Dealers Throughout the World

725 MILLER ST., BENTON HARBOR, MICH., U.S.A.

MATERIALS HANDLING EQUIPMENT

Begins on page 178



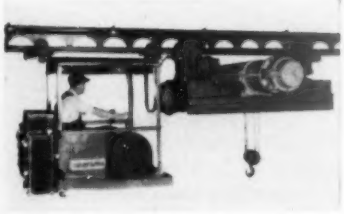
For Handling Large Reels

You can move reels up to 96 inches in diameter, weighing up to 20,000 pounds, with this platform truck. Load is pulled onto rocking platform by dual cables connected to power winches on the vehicle. As roll strikes a horizontal bar, power to winches is automatically cut off.

When reel is on truck, the rocking platform is always slightly tilted away from truck, so when you slacken cable, reel rolls easily and safely to floor. Cable always controls discharge of reel, so loads can't get out of control.

Elwell - Parker Electric Co., 4205 St. Clair Ave, Cleveland 3.

■



Tramrail Carrier With Hydraulic Scale

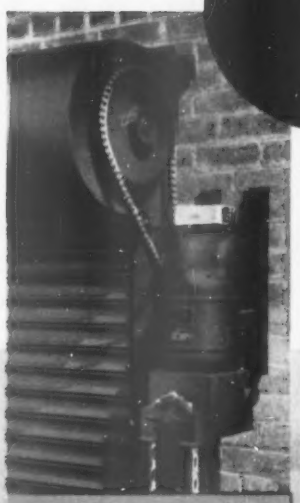
Carrier can weigh quickly and easily all loads handled. This tramrail carrier travels 300 fpm., has hoist speed of 38 fpm. and a lift of 36 feet. Load capacity is 3 tons. Hydraulic cell is operated by lever to which is fastened the hoist block. Resulting pressure is transmitted from cell to scale dial by hydraulic tubing.

Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Turn the page

Rolling Steel DOORS

MAHON CHAIN-GEAR OPERATOR



MAHON STANDARD POWER OPERATOR 920-P

Manually, Mechanically, or Power Operated

Illustrated below is another excellent example of Rolling Steel Doors installed in a special purpose building where no other type of door would meet the requirements. Because this is a foundry building with high truss clearance, vertical acting doors with no overhead obstructions above the floor adjacent to the door opening were demanded by the owners . . . other requirements were: that the doors shut off no light above the lintel when open, and, that the opening and closing action of the doors occupy no usable space either inside or outside of the door opening. The vertical roll-up action of rolling steel doors met these demands perfectly . . . and, in addition, their all-metal construction provided permanence, better protection against intrusion and fire, and assured the owners a lifetime of continuous trouble-free service. Rolling Steel Doors will meet your requirements better too. But, when you select a rolling steel door, know the facts—check and compare the specifications carefully . . . you will find that Mahon Rolling Steel Doors have built-in extra value features which you will want in the doors you buy. See Sweet's Files for complete information including specifications, or write for Catalog G-53.

THE R. C. MAHON COMPANY

Detroit 34, Michigan • Chicago 4, Illinois • Representatives in all Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Doors and Fire Shutters; Insulated Metal Walls and Wall Panels; Steel Deck for Roofs, Partitions, and Permanent Concrete Floor Forms.

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Fifteen Mahon Rolling Steel Doors installed in a new special purpose building recently constructed as an addition to a large midwest foundry.

MAHON

PRECISION IN ORIGINAL EQUIPMENT...PRECISION IN REPLACEMENT—

Replace with

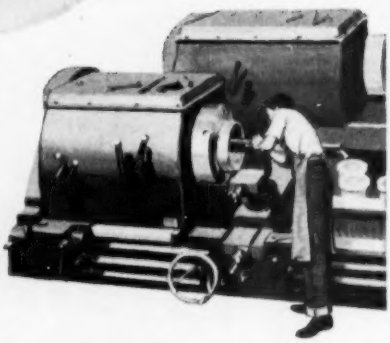
BOWER ***quality***

for

TROUBLE FREE OPERATION

You get smooth-running, durable precision from your machines when you replace with Bower roller bearings.

Your bearing specialist provides Bower precision in tapered, straight and journal roller bearings. It's a quality service . . . with *fast delivery!*



BEARING FEDERAL Mogul SERVICE

FEDERAL-MOGUL SERVICE

(Division of Federal-Mogul Corporation)

DETROIT 13, MICHIGAN

Our 75 branches, in all principal cities, provide your bearing specialist with Federal-Mogul service on Bower bearings

MEASURING & CONTROL

Flexible, Unbreakable Slack-Tube Manometer

It rolls up into a small unit to fit easily in your pocket or service kit. Body is made of durable vinyl-plastic and can be rolled, twisted, or bent into any shape without adverse effects. Called Series No. 1211, this unit is equipped with a convexed spring-steel scale for rigidity in use and flexibility for convenient carrying. Available in standard ranges from 8 inches to 10 feet, in water or mercury.

F. W. Dwyer Mfg. Co., 317 S. Western Ave., Chicago 12.

■

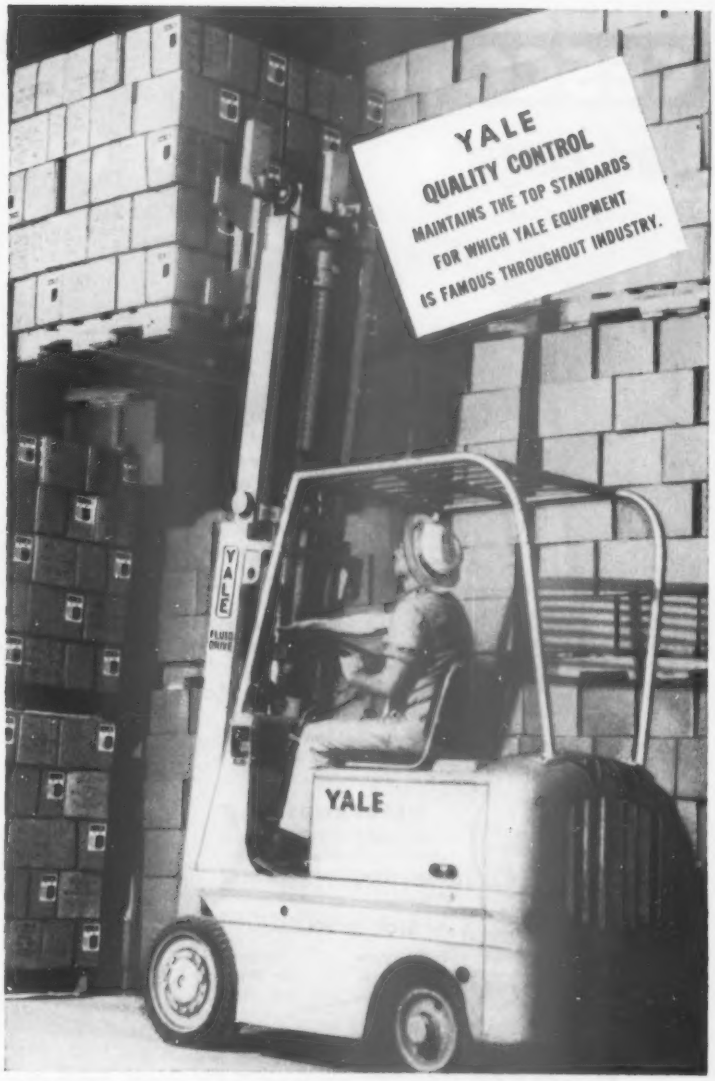
Electronic Level Control

The KTROL electronic level control enables precise level control for nonconductive materials ranging from condensed gases to semi-solids, particularly in the high-temperature and high-pressure ranges where exacting level controls are desired.

The compact unit has a plug-in,

Again in '53 YALE sets the pace

Give this great YALE truck every test you know. Run it fully loaded on ramps, indoors and out. See the power it delivers... the fuel economy it gives. Let operators test it for smoothness...for maneuverability... for safety...and you'll see why it's the standout truck of this or any other year.



Features no other truck combines

1. Fluid Drive...gives 3 to 8 times longer clutch life
2. 65 HP industrial engine built for rugged continuous service
3. Automotive Type Brakes with extra braking surface
4. Shockless steering...for greater operating ease and safety
5. Hypoid Gears oil-sealed against dirt and dust, give drive 30% more strength against shock loads

*Registered trade mark

A line that meets every materials handling need

Whatever type of truck will serve you best—Gas, Electric or Diesel powered—you'll find it in YALE's comprehensive line.

Also ask for full information on the numerous attachments Yale makes available for special handling problems.

YALE* MATERIALS HANDLING EQUIPMENT

MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 32
Roosevelt Blvd. and Haldeman Ave., Phila. 15, Pa.

☐ Please send me
The Picture Story of Yale Materials Handling Equipment

☐ Please have your local representative call for an appointment

Company_____

Name_____ Title_____

Street_____ City_____ State_____

In Canada write: The Yale & Towne Mfg. Co., Box 337—Postal Station "A"—Toronto

Gas and Electric Industrial Trucks • *Worksavers* • Hand Trucks • Hand and Electric Hoists • Pul-lifts

CESCO RIGHT... before your Eyes!
New, Larger COVER GOGGLES
fit over ALL modern glasses...
New CESCO Cover Goggles fit well over all popular styles of glasses— even over extreme types such as these.
FEATURES
Lightweight, sturdy plastic with contoured edges. Weight is well-distributed for comfort and safety.
LENS VENTILATORS
Slots in edges of lens frames and rings are offset to baffle air flow.
HEADBANDS
Three types, all fully adjustable—Comfort King round rubber, flat rubber, or elastic.
SIDE SHIELDS
Baffled type for welders.
Perforated for chipping and grinding.

The *NEW* CESCO series 548 and 549 Cover Goggles are 20% larger than former cover goggles and will fit comfortably over all popular styles of men's or women's glasses. Newly designed, contoured edges eliminate pressure points on the nose and seal out flying particles or light flashes. Larger air space within goggles reduces fogging.

Screw-type retaining rings permit quick lens change from front. Standard 50mm lenses set flush with rings to deflect flying objects. Chippers style has indirect ventilation through slotted lens rings and direct ventilation through perforated side shields. Welders and dust models have indirect ventilation through side shields. Simplified bridge adjustment. Choice of 3 adjustable headbands: elastic, flat rubber or Comfort King round rubber.

For a really modern goggle, there is nothing better than the **No. 548** CESCO Cover Goggle. It is *"Right... before your eyes!"*

See or write your CESCO safety equipment distributor for full details

CHICAGO EYE SHIELD COMPANY • 2312 Warren Blvd. • Chicago 12, Ill.

CESCO FOR SAFETY

OFFICES IN: Atlanta, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Detroit, East Orange, Houston, Kansas City, Knoxville, Little Rock, Los Angeles, Mexico City, D. F., Milwaukee, Montreal, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Spokane, St. Louis, St. Paul, Toledo, Tulsa

MEASURING & CONTROL EQUIPMENT

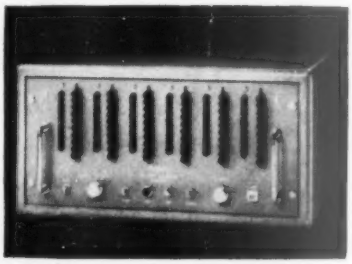
Begins on page 190

sealed housing containing all components. You can replace this plug-in unit in a matter of seconds.

Unit is designed so that electronic circuit will maintain level control from ±1/16 inch and up. Custom-built, non-corrosive probes are available for the material to be controlled and the kind and size of tank or container to be used.

Greylor Co., 605 W. Washington Blvd., Chicago 6.

■



High-Speed Electronic Counter

Here's helping hand for your counting pr blem in high-speed packaging operations. This electronic unit, called Preset Counter, gives you output information at any count up to the maximum capacity of the unit. The output information can be offered in the form of a ±125-volt pulse or 1/30-sec. relay closure. Any discrete physical change from 0 to 40,000 times per second that can be converted into a changing voltage can be counted.

Output signals can be used to control a multitude of processes automatically or to give an alarm when present count is reached.

Berkely Scientific Co., 2200 Wright Ave., Richmond, Calif.

■

Pressure Pneumatic Transmitter

A new instrument combines a pressure gage and a reliable pneumatic transmitter for use in ranges from vacuum to 10,000

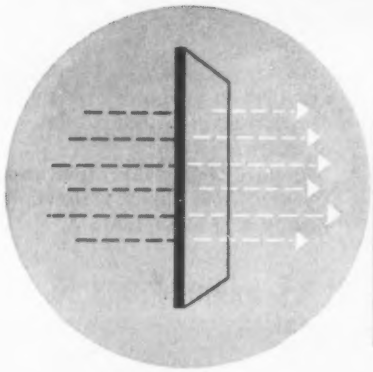
here's how

you can

CUT COSTS
INCREASE PRODUCTION

in all types of

METAL WORKING OPERATIONS

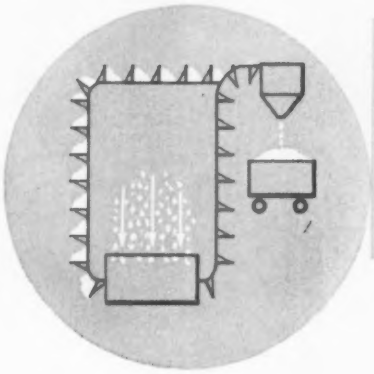


1 **HOUDAILLE AUTOMATIC FILTERS**

...to keep oils and coolants clean

magnetic? web? clarifier?

for individual machine tools or central systems



2 **HOUDAILLE AUTOMATIC CONVEYORS**

...for automatic, low-cost removal of chips, scale, sludge, etc.

1+2 =

- Fewer Rejects—Increased Production
- Longer Tool and Wheel Life
- *Much* Lower Maintenance Costs
- Reduced Oil and Coolant Costs

WORLD LEADING OIL FILTER MANUFACTURER

ALL HONAN-CRANE EQUIPMENT IS SOLD ON A PERFORMANCE GUARANTEED BASIS

Fill in coupon below for complete details on Houdaille automatic filtration and handling equipment.

Honan-Crane Corp. 325 Superior Avenue, Lebanon, Ind.
a subsidiary of **Houdaille-Hershey Corp.**

Please send me details on the following equipment . . .

☐ **Houdaille Oil and Coolant Filters**

☐ **Houdaille Automatic Conveyors**

NAME..... TITLE.....

COMPANY..... ADDRESS.....

In Canada:
E. W. Playford, Ltd., Montreal 28 • W. S. Micklethwaite, Toronto 18 • Cummings Galbraith, Ltd., Edmonton, Alta.

Salvaging dollars

from COTTON SEED PROCESS DUST with The DUSTUBE®

COLLECTOR at FARMERS' AND GINNERS' COTTON OIL COMPANY

This Dustube Collector annually salvages over $7000 worth of valuable cotton seed bran feed.

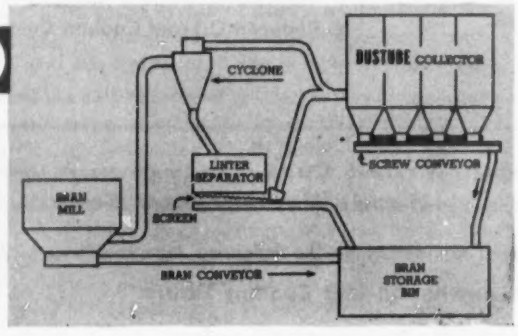
Although the meat packer proudly claims a use for everything but the pig's squeal, even the processing dust created in cotton seed by-products production is profitably salvaged at Farmers' and Ginners' Cotton Oil Co., Birmingham. This firm not only extracts oil from the seed, but they also obtain valuable cattle bran feed and linters or fibre from the seed hull. In the Fibre Department dust, consisting of marketable material, had always been a problem. Its escape into the atmosphere created extremely dusty conditions adding to plant maintenance costs, and its extreme fineness and other characteristics made it a fire hazard. Cyclone collectors and a large settling room were ineffective.

SAVES $7000 ANNUALLY

Addition of a high efficiency Dustube cloth-tube type Dust Collector to the system solved this problem — and at a profit. The Dustube Collector filters the dust laden air so that only clean air is discharged. Salvaged dust is now automatically returned to the process at an estimated savings of over $7000 annually.

Results of Dustube Collector efficiency like this are duplicated throughout the chemical processing industry. Dustube engineers will be glad to show you how your dust and fume problems can be handled with equal efficiency.

Write today for Catalog 72-B.



Flow chart illustrates how the Dustube Collector ventilates all dust creating operations and salvages valuable bran feed.

American WHEELABRATOR & EQUIPMENT CORP.
374 S. Byrkit St. Mishawaka, Indiana

dustube COLLECTORS

psig. Output pressure of transmitter varies from 3 to 15 pounds, or 5 to 25 pounds, regardless of the range of pressure being measured. You get highest accuracy because instrument is calibrated with comparison of actual pressure applied to gage versus transmitted air.

Distances up to 1000 feet are practical in bringing pressure indication or recording to any part of plant.

Penn Industrial Instrument Corp., Penn Bldg., 4110 Haverford Ave., Philadelphia 4.

■

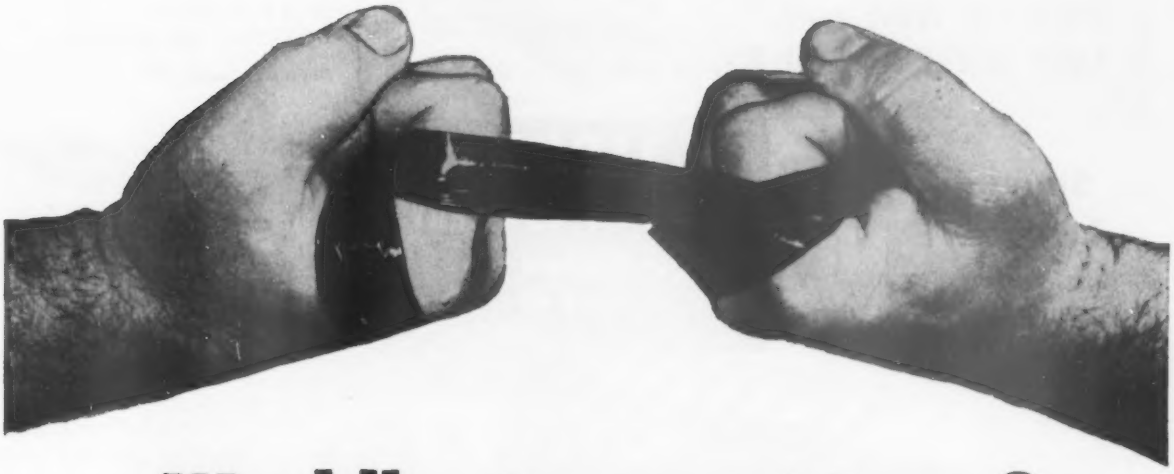
Static Pressure Control

This unit employs a silicone-impregnated glass-cloth diaphragm, allowing operation at high or low temperatures over long periods of time. It's designed for application on very low pressures where regulation is required in inches of water, either pressure or vacuum. Especially useful where it is necessary that a circuit be controlled from the exhaust side of a fan and, in event of fan failure, auxiliary equipment will be shut down.

UL-approved electrical ratings are 10 amperes, 125 volts or 5 amperes, 250 volts a-c.

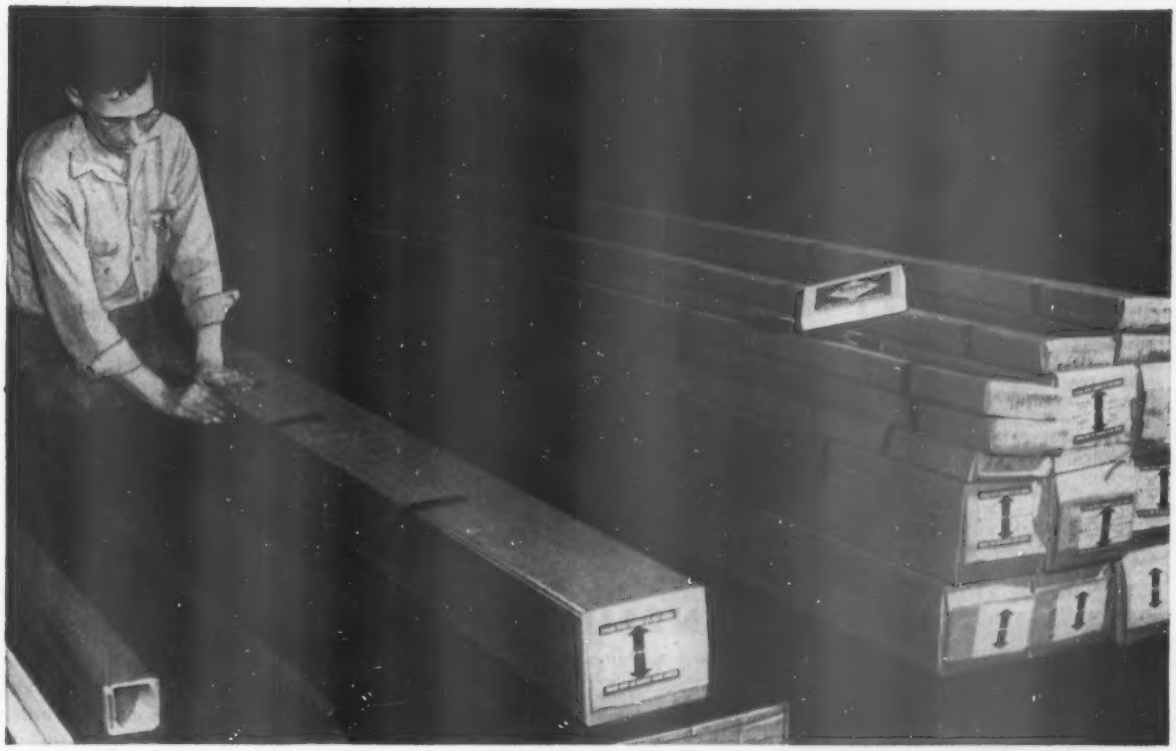
Henry G. Dietz Co., 12-16 Astoria Blvd., Long Island City 2, N. Y.

Turn the page



World's strongest tape?

It keeps bulky 12 ft. cartons of heavy hardware in perfect SHIP shape!



Tired of trouble with usual "heavy-duty" banding materials? Lorentzen Hardware Mfg. Co., New York City, can give you plenty of reasons for switching to "Scotch" Brand Filament Tape No. 880.

They find this tape has ***remarkable strength***. Five 8-inch strips safely band 150 lb. cartons 12 feet long. That means real economy—real savings!

And they find this tape is *resilient*. Repeated impact shocks won't break it.

They find this tape is *fast* and *safe*, too—sticks tight to the carton right off the roll, can't cut or injure workmen. And no special applicating equipment is needed, either.

Find out for yourself! Available in a variety of lengths, widths and colors. Order a supply today, or write for full information.

REG. U.S. PAT. OFF.
SCOTCH
BRAND
FILAMENT TAPE
NO. 880

3M

The term "Scotch" and the plaid design are registered trademarks for the more than 200 pressure-sensitive adhesive tapes made in U.S.A. by Minn. Mining & Mfg. Co., St. Paul 6, Minn.—also makers of "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ont., Can.

MODERN TIME and COST SAVERS BUILT BY... Standard GRAVITY & POWER CONVEYORS

Standard LITEWATE *Sectional Roller Conveyor*

LIGHT AND EASY TO CARRY

Put it where you need it!

— ideal for loading and unloading trucks and conveying jobs that require moving about — one man can easily pick up and carry a section or curve with little effort. Handles commodities weighing up to 60 lbs. — moves bags, cases, cartons, hollow bottom, narrow, cleated and irregular packages or articles not suited to wheel conveyors. Available in 10 ft. and 5 ft. straight sections and 90° and 45° curves. Write for Bulletin 63 B — address Dept. **FM-23.**

Standard All Purpose Roller Conveyor

— available in a complete line of roller sizes and capacities designed to allow the selection of the best roller for the job, from a 1 inch diameter roller, capacity 35 lbs., to a 3½ inch diameter with a capacity of 550 lbs. Any commodity with one smooth riding surface can be carried — boxes, cases, cartons, lumber, milk cans, brick, building tile. Straight sections and 90° and 45° curves. Write for Bulletin 63 B — address Dept. **FM-23.**

Faster Handling in Shipping Rooms with the HANDIBELT

— conveys bags, cartons, boxes horizontally or at any decline and incline angle within its range. Easily wheeled about by one man — easy to adjust and use — fits in crowded aisles, cars, freight elevators. Handles packages up to 135 lbs. Can be placed in series to form a complete conveyor line. Available in 3 sizes: No. 11, No. 16, and No. 21 with 14 and 21 inch belt widths. Write for Bulletin No. 63 B — address Dept. **FM-23.**

Lift or Lower . . . Floor to Floor . . . with the INCLINEBELT

— move boxes, cases, cartons, sacks or bundles from basement to first floor, or any floor to floor — continuously. Compact, simple to install — minimum maintenance. Lift or lower 10 to 20 lbs. of live load per ft.; floor elevations of 8 ft. to 14 ft. 6 inches inclusive; belts widths — 8, 12, 14, 18 and 24 inches for commodities of various sizes. A horizontal feed section is generally used to deliver commodities to the Inclinebelt. Write for Bulletin 63 B — address Dept. **FM-23.**

STANDARD CONVEYOR COMPANY

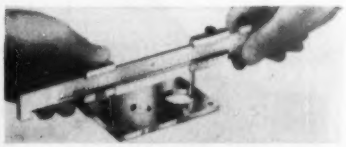
General Offices: North St. Paul 9, Minnesota

Sales and Service in Principal Cities

Send for Standard Bulletin 63 B describing gravity and power conveyors units — address Dept. Fm-23.

MEASURING & CONTROL EQUIPMENT

Begins on page 190

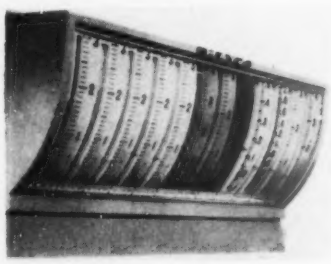


Center Distance Gage

This gage, named Center-Mike, enables you to measure distance between hole centers quickly and accurately without knowing diameters. Basically, Center-Mike is a vernier gage and a slide rule combined. It gives you a direct reading of center-distance for any combination of holes within its range, without need for setup. Comes in three sizes, for maximum center-distances of 4.400, 7.400, and 12.400 inches.

Sorensen Center-Mikes, Inc., 264 Kossuth St., Bridgeport 8, Conn.

■



Draft Gage

The Hays Vertiscale lines up these features: 3-way atmospheric vent, easy 1-man zero check, large identification label space, magnetic access door, fluorescent lighting for easy reading, removable units, no paralax, dust-tight case, and lucite scales.

Vertiscale's basic operating mechanism consists of a diaphragm, the force and movement of which is balanced against the force of calibrating springs. From 1 to 12 units can be mounted side by side in a single case. Ranges from 0.2 inch to 120 inches of water, draft, and differential.

The Hays Corp., Michigan City, Ind.

Turn the page

Have been used successfully in industry for 40 years. A wide range of sizes and types offers a valve to fit almost every application. Cast from high-grade steam bronze, with quality discs that stop hard-to-hold liquids and gases. Ask your distributor about Ohio Brass Valves.

Ohio Brass

MANSFIELD OHIO, U. S. A.

BRONZE GLOBES, ANGLES, GATES AND CHECKS FOR INDUSTRIAL SERVICE

4369-V

THE BEST IS NONE TOO GOOD For

SUPREME
BRAND
CHUCKS

JAWS NICKEL CHROME MOLY ALLOY STEEL . . . expertly heat treated for durability
KEY HOLES— do not extend into body cavity thereby sealing out dirt
STURDY ONE PIECE GEARED NUT CONSTRUCTION . . . prevents slippage
ENTIRE CHUCK BODY HARDENED—Inside and Out
TAPER BORE HARDENED AND GROUND
INDIVIDUALLY TESTED FOR ACCURACY
CHUCKS AND KEYS interchangeable with other makes

SUPREME IS A
quality chuck...

The makers of Supreme brand Chucks are experienced manufacturers of precision mechanical assemblies with an enviable reputation for skill and craftsmanship. This know-how plus the most modern manufacturing equipment gives a chuck that can truthfully be called a quality product. The Supreme Chuck is engineered to give accurate precise performance and stand up under hard steady usage on the job.

You can buy a Supreme brand Chuck with the confidence that you are getting a "top" quality product.

AVAILABLE AT YOUR DISTRIBUTORS

SUPREME BRAND CHUCKS

Supreme Products, Inc., 2222 South Calumet Avenue, Chicago, Illinois

THE CHUCK THAT LIVES UP TO ITS NAME . . . SUPREME

WHAT'S NEW IN EQUIPMENT
Begins on page 156

SAFETY & PLANT PROTECTION

More Efficient Sprinkler

The circular deflector throws water outward and downward, instead of bouncing 60% of spray off the ceiling, as do conventional sprinklers. Unit was developed as result of tests that have shown that the most effective fire-fighting spray is one that's more even throughout and made up of drops of varying sizes, including fine mist. Two models, for pendant and for upright installation.

"Automatic" Sprinkler Corp. of America, Jones & Brittain Sts., Youngstown 1, Ohio.

■

RESUSCITATOR, complete with aspirator, mask, airway, and mask elbow, is offered in a handy carrying case by the Ohio Chemical & Surgical Equipment Co., 1400 E. Washington Ave., Madison 10, Wis. Called Model 116, the 2-lb. unit has automatic valves and safety devices to make application errors impossible. Can be used regardless of patient's position, with or without oxygen.

Turn the page

STOP costly blink-blink-blink

WITH G-E WATCH DOG NO-BLINK FLUORESCENT STARTERS

The blinking of a failing fluorescent lamp not only annoys workers and lowers efficiency, but each blink costs actual money. It shortens the life of starters and ballasts—they burn out before they should. Here's how General Electric's Watch Dog* no-blink starters eliminate these needless costs.

- Watch Dog starters *stop blinking* by automatically turning off failing lamps that cause blinking.

- A Watch Dog starter *keeps the lamp off*—no recurring blinking every time fixtures are turned on.

- Because they eliminate blinking, Watch Dog starters *outlast* ordinary starters by as much as 10 to 1—ballasts also last longer.

Remember, too, emergency relamping is eliminated when you standardize on Watch Dog starters. And Watch Dog starters are essential to any schedule of group lamp replacement—the modern, economical method of lamp maintenance.

Specify Watch Dog no-blink starters for new fixtures—insist on them for replacement. You'll make important savings in maintenance costs and won't be bothered by blinking lamps. For all the facts on the Watch Dog starter line, write for a copy of folder Q46-234. Construction Materials Division, General Electric Company, Bridgeport 2, Conn.

Registered Trade-mark General Electric Company

For all replacement needs—use the famous Watch Dog no-blink starter with the red reset button.

And here is the tag to look for when you buy fluorescent fixtures. It is an indication that the fixture has been equipped with G-E Watch Dog no-blink starters.

You can put your confidence in—

GENERAL ELECTRIC

Materials Handling and the Telescriber

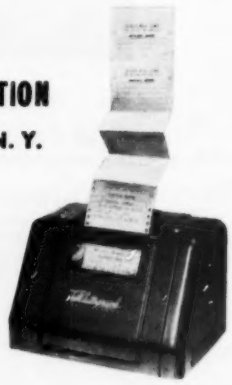
From raw materials to finished product, the flow of materials affects the speed of work-in-process. As in any control function, information is the parent of action. However, information is valueless if it is not where it is needed *at the time* it is needed. A basic requirement then, is proper communication.

Telescriber communication is handwritten—electrically transmitted—simultaneously received in multiple locations. Telescriber communication eliminates the need for carbons and hand delivered orders. Each outlying station automatically receives an individual copy assuring clear, legible, indelible messages which can be put on 'Instan-Forms' designed to fit your needs.

Telescriber communication integrates your material handling operations allowing rigid administrative control and effecting cost and inventory reduction.

For details of the application of TelAutograph standard telescribers and TelAutograph 'Instan-Form' telescribers in materials handling operations write to Dept. B-32.

TelAutograph CORPORATION
16 West 61st Street, New York 23, N. Y.

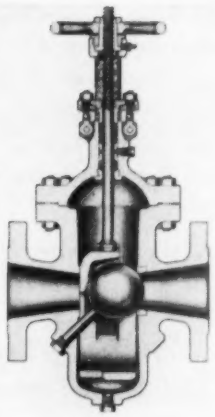


Telescribers TelAutograph * Service

*Trade Mark

Instan-Form *

VALVES & FITTINGS



Venturi Ball Valve

The disc in this venturi valve is a ball that is not attached directly to the stem, but rides in a cage which is attached to stem by a tee-head slotted construction. In operation, ball is moved to and from center of flow, rolls into and out of body seat. Cast steel valves available in 150-, 300-, and 600-lb. classes, alloy valves in 150- and 300-lb. classes.

Crane Co., 836 S. Michigan Ave., Chicago 5.

■

Rotating Steam Joint

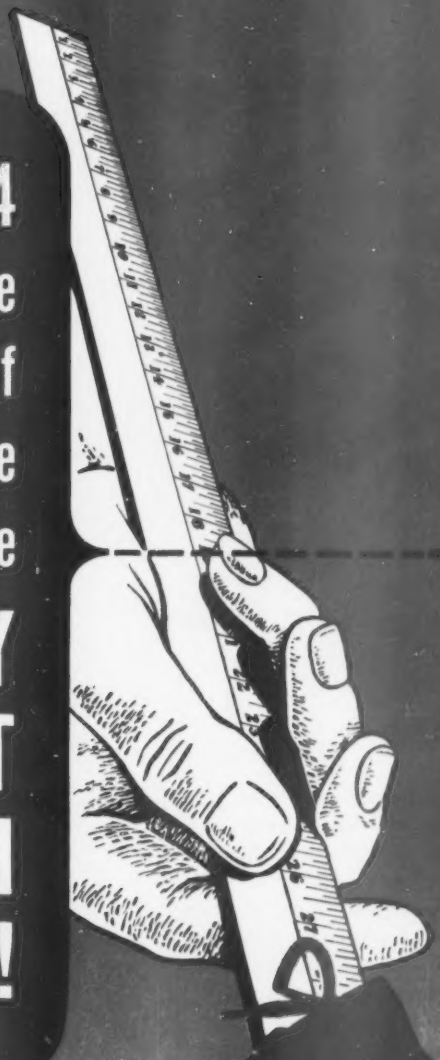
The Velan Rotodrain is described by manufacturer as the most advanced and complete design of rotating steam joints, featuring for the first time an integral drainage control which cuts costs of installing separate airvents, steam traps, check valves, temperature controls, etc. Other features are: in-line servicing of seal, easy field service, external adjustment of syphon pipe, visible operation control.

Velan Engineering, Ltd., 1 Exchange Pl., Jersey City, N. J.

Turn the page

these 14 features are the yardstick of safety shoe value

ONLY HY-TEST HAS THEM ALL!



- Completely stitched with Dacron thread
- Inseaming with Nylon (Mildew Proof) thread
- Solid leather counters
- One-inch austempered steel shanks
- Isco-nap lining
- Storm welting
- Cush-ion insole
- Resist-Oil soles and heels
- Neoprene Cushion Crepe soles and heels
- Neoprene Crepe soles and heels
- Neo-Cord soles and heels
- Neo-Cork soles and heels

. . . and these outstanding EXCLUSIVE features

- Anchor Flange Austempered steel Box toes
- Boltan leather insoles Sweat resistant (7 iron)

HY-TEST SAFETY SHOES

Insure Workers' Feet in Sure Protection

HY-TEST SAFETY SHOES

THE WORLD'S LARGEST SELLING SAFETY SHOE

DIVISION OF INTERNATIONAL SHOE COMPANY,

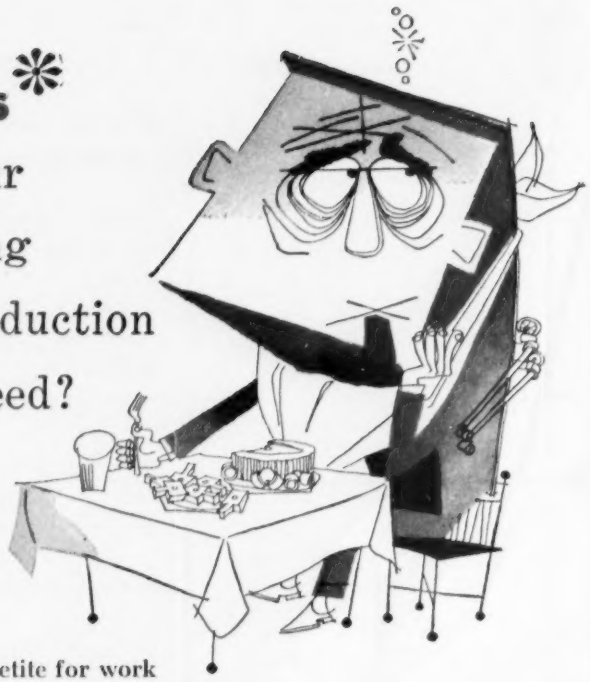
ST. LOUIS 3, MISSOURI

NEW YORK OFFICE: SUITE 1705, 220 EAST 42ND ST.

does

coil-itis *

have your processing tank production off its feed?



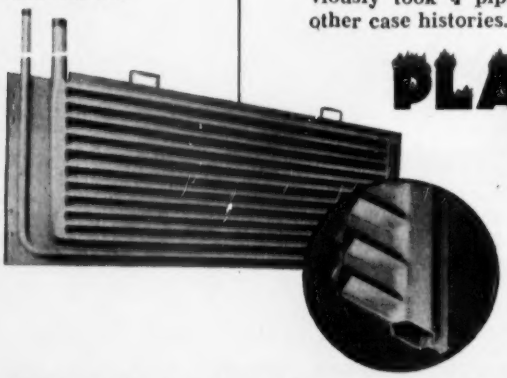
When the appetite for work of your heating and cooling processes diminishes, the trouble may well be coil-itis. For, downtime due to pipe failures and limitations can seriously delay your production flow. Switch to Platecoils, the new tonic for production, as revolutionary as the new wonder drugs. Platecoils take 50% less tank space leaving more room for greater payload. They heat or cool 50% faster. They simplify maintenance and save hours of downtime. Equally important, Platecoils cost as much as 50% less in the first place. Platecoils cure production troubles involving heat transfer and give production a shot in the arm.

Write for Bulletin P60 today!

PLATECOILS SAVE 50% IN HEAT TRANSFER COSTS

PLATECOILS ELIMINATE A 6-TO-8 HOUR-A-DAY CHIPPING JOB

At Sealed Power Corp., installation of Platecoils has completely eliminated a 6-to-8 hour-a-day chipping job. Three Platecoils now heat a tank that previously took 4 pipe coils. Ask about other case histories.



PLATECOIL

REPLACES PIPE COILS

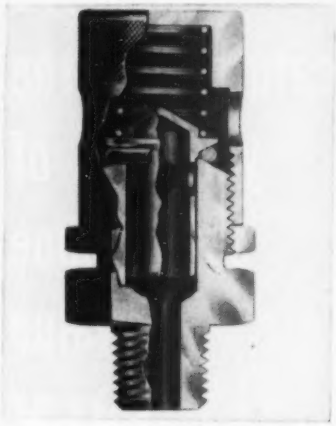
*

Coil-itis — Diagnosed as tank heating and cooling problems. Platecoils — the prescription for solving pipe coil problems.

PLATECOIL DIVISION, KOLD-HOLD MANUFACTURING CO., LANSING 4, MICHIGAN

VALVES & FITTINGS

Begins on page 200



Low-Pressure Relief Valve

This valve is designed for controlling gases that you can safely release into the atmosphere. It gives protection in systems where leakage cannot be tolerated. Designated as the 5400 Series, valves come in brass or aluminum; special materials to order. Operating temperatures range from 40F. to 280F. in production. Can be equipped with "O" rings for temperatures of –80F. to 400F.

James-Pond-Clark, 2181 E. Foothill Blvd., Pasadena 8, Calif.

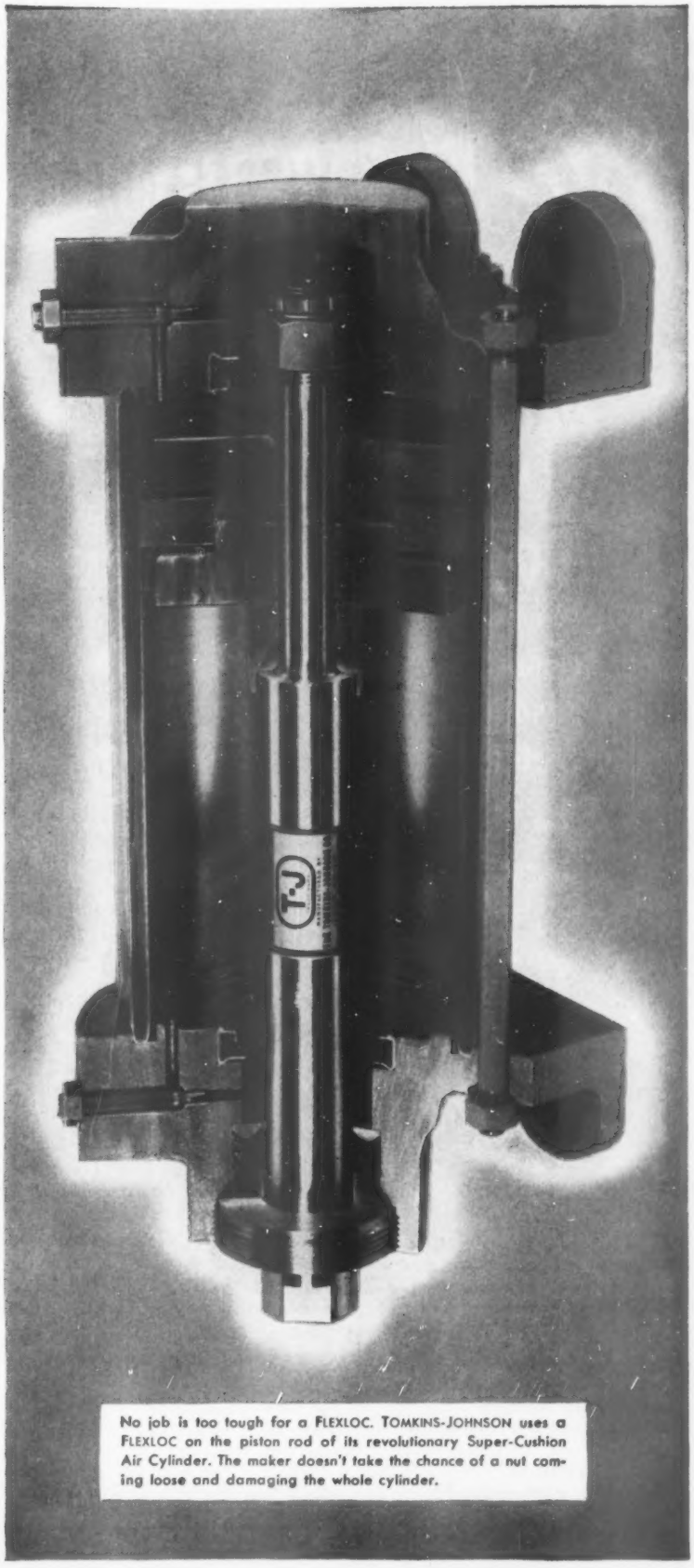
■

CYCLOFLOW VALVE, developed by American Water Softener Co., 330 W. Lehigh Ave., Philadelphia 33, is primarily designed for controlling cycles of flow in ion-exchange equipment. Valve completely eliminates all possibility of contaminating leakage by providing an isolated section connected to waste between outlet and all sources of contamination.

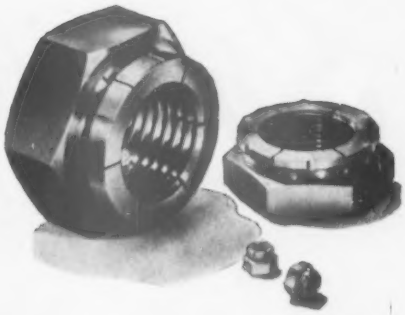
■

SENTRY PISTON-OPERATED QUICK-OPENING VALVE controls release of water for fire-fighting equipment, dumps process vessels to outside storage in emergency. Any number of these valves can be operated from one set of controls. Standard model is rated at 250 psi. Made by The McRae Corp., 621 S. Spring St., Los Angeles.

Turn the page



No job is too tough for a FLEXLOC. TOMKINS-JOHNSON uses a FLEXLOC on the piston rod of its revolutionary Super-Cushion Air Cylinder. The maker doesn't take the chance of a nut coming loose and damaging the whole cylinder.



What FLEXLOC locknuts do for you

FLEXLOCs eliminate complicated, time-consuming methods of locking threaded fasteners. They offer simpler, faster application and safer, more dependable locking than plain nuts and lockwashers, castellated nuts and cotter pins, or nuts and jam nuts. And they won't work loose.

The reasons for all this are plain. FLEXLOCs are one piece—nothing to assemble, come apart, lose or forget. FLEXLOCs are all metal—have higher tensile than most other locknuts and are not affected by temperatures to 550°F. FLEXLOCs are both stop and locknuts—don't have to seat to lock, and stay put anywhere on a threaded member as soon as their locking threads are fully engaged.

SPS can deliver any quantity of FLEXLOCs in a wide range of sizes. Stocks are carried by industrial distributors everywhere. Write for literature. SPS, Jenkintown 11, Pa.

FLEXLOC

LOCKNUT DIVISION

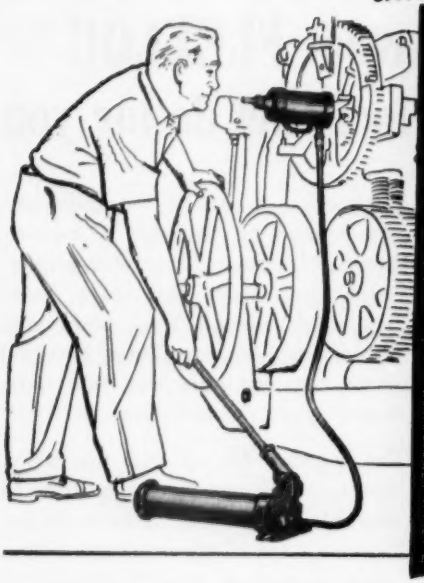
SPS

JENKINTOWN PENNSYLVANIA

Our Fiftieth Year : A START FOR THE FUTURE

Simplifies PULLING!

LESS RIGGING NEEDED! LESS SET-UP TIME! SAVE THE TOOL COST ON ONE JOB!



The New SIMPLEX Re-Mo-Trol Hydraulic Pumps and Remote Controlled Rams "Center-Hole"* PULLERS

The only remote control puller offering this time and work saving advantage! Just insert a pull rod or screw through the tubular ram and secure it to the object to be pulled. Rod is drawn through ram as plunger extends, in a direct-line pull. No complicated rigging. Ram is its own back-up. Sketch shows typical use removing sleeve.

Exclusive "Center-Hole" Speeds the Job!

PUMPS AND RAMS *Interchangeable*

Two pumps—seven rams. Smaller pump handles all Rams up to 30 tons capacity, larger pump handles any Re-Mo-Trol Ram. You can buy only the units you actually need!

If it can be pulled, Re-Mo-Trol can pull it easier! Pulls gears—wheels—pinions—axles—shafts—sleeves—liners—studs. Operates as shown with center pulling screw, or pull rods and bracket. Or use it for any kind of conventional lifting or pressing job. Seven complete units—10 to 100 tons capacity.

*On Rams of 30-tons or greater capacity

Simplex LEVER • SCREW • HYDRAULIC Jacks

Write for Bulletin: Hydraulic 51 for full information

TEMPLETON, KENLY & CO. • 1018 South Central Avenue, Chicago 44, Illinois

MISCELLANEOUS

Rubber Floor Duct

Your over-the-floor wiring problems are solved by Flexiduct, a tough rubber floor duct that you install easily and quickly with a special cement. Eliminates noisy, expensive floor drilling.

Riser fittings are available so you can run wires directly up under desks or other equipment. Also come in "L" and "T" angle fittings that simplify installation, protect wires.

Goodyear Tire & Rubber Co., St. Marys, Ohio.

■

Mild Abrasive Hand Cleaner

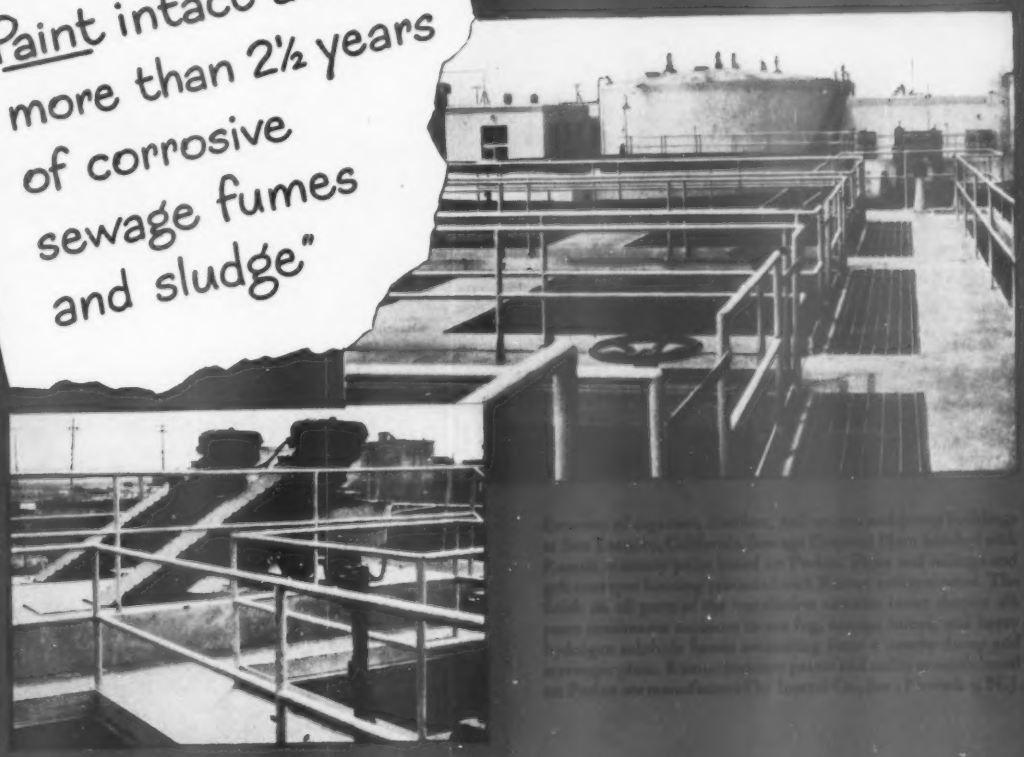
Corn-cob meal provides abrasive action in a new free-flowing powder, called Magnus Cob Hand Cleaner. Described as a soft, mild abrasive hand cleaner. Powder really cleans dirty hands—and at cost of less than 1/10¢ per wash. Cleaner contains lanolin and toilet-grade soap. Gives good lather, rinses readily. Will not rot, ferment, attract vermin, or clog plant drains. Shipped in 90- and 185-lb. drums.

Magnus Chemical Co., Inc., Dept. FM, Garwood, N. J.

Turn the page

Parlon Stays On!

"Paint intact after more than 2½ years of corrosive sewage fumes and sludge"



SEWAGE FUMES and sludge...hydrogen sulphide gases...heavy salt sea fog...heat...cold...condensation...day in and day out! How long can exterior paints take this punishment? At California's San Leandro Sewage Disposal Plant, Inertol's Ramuc paint based on Hercules Parlon (chlorinated rubber) continues to protect and beautify masonry and metal after more than 2½ years of severe exposure.

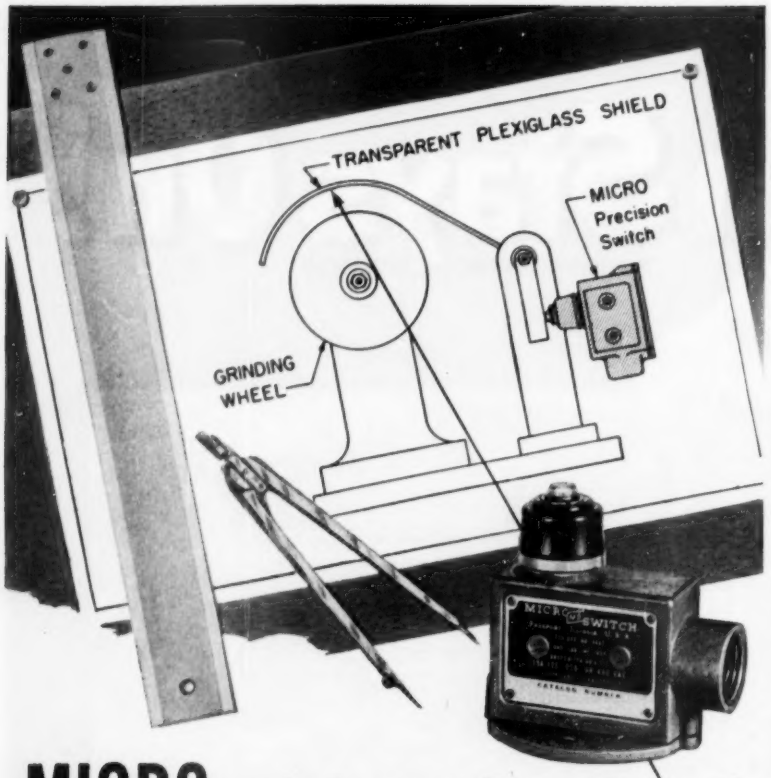
Wherever corrosion is a problem, not only in sewage disposal plants and water works, but in paper and textile mills, metal refineries, breweries —to name a few of the many places where Parlon-based finishes now serve—you can depend on these sturdy protective coatings to check attacks from acids and alkalies, to give better service at lower long-term costs. See your paint supplier for details on Parlon paints, or write:

Cellulose Products Dept., HERCULES POWDER COMPANY 905 Market St., Wilmington 99, Del.

Parlon® CHLORINATED RUBBER PAINTS

AVAILABLE FROM 400 PAINT MANUFACTURERS UNDER THEIR OWN BRAND NAMES

CR53-6



MICRO switch says "no grinding" unless protecting shield is over the wheel

HERE'S a safety use of a MICRO precision switch for almost any plant, protecting eyes and face of grinding wheel operators from flying particles.

Plexiglass shield is linked to the plunger actuator of the MICRO switch which only closes the power circuit when the shield is in the "down" position.

This application of a MICRO switch to a universal plant problem is just one of hundreds of uses that plant engineers, electricians and operating men are finding for these versatile switches.

As limits, safeties and interlocks, they make existing equipment safer, more efficient and more productive. They are available for bottom and side mounting and with actuators to take any kind of actuating motion.

Ask for them at your local authorized MICRO distributor. You will find him under "switches, electric" in your classified telephone book. MICRO field engineers are located in principal cities, too, to assist in the solution of complex switch problems. Call your nearest MICRO branch office.

MICRO
MAKERS OF PRECISION SWITCHES
FREEPORT, ILLINOIS

A DIVISION OF
MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

MISCELLANEOUS EQUIPMENT

Begins on page 204

For Your Cafeteria

This new food checking machine and cash register, designated the National Class 21, takes up less counter space than a food tray. It issues a printed ticket that shows name of cafeteria, date, individual prices, tax, and total bill. Machine has $9.99 keyboard and is available with or without cash drawer.

The National Cash Register Co., Dayton, Ohio.

■

Flame-Resistant Curtains

You can hang these impregnated, flame-resistant canvas curtains to form inexpensive booths to screen off dangerous operations. They provide complete protection for workers vulnerable to arc flash, molten splash, flying chips, etc. Curtains made to order from 8-, 10-, or 12-oz. duck and asbestos cloth.

Eastern Equipment Co., Inc., Willow Grove, Pa.

Turn the page

Compare these advantages of U. S. ROYALASTIC Tape!

★U.S. Royalastic Vinyl does two jobs in one — it provides as much as 200% more dielectric protection and 50 to 100% more mechanical protection.

★Adheres perfectly and permanently to all kinds of shapes, yet it can be stripped cleanly and neatly.

★Extra rugged to withstand abrasion.

★Resists acids, alkalies, oils, water, temperature changes and weather conditions.

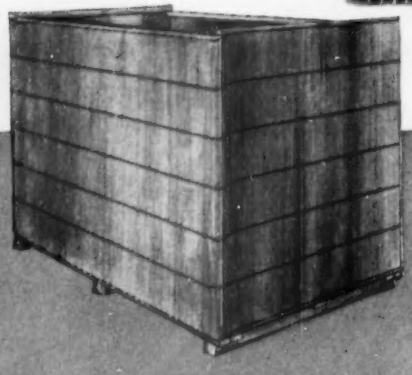
★Saves time and space in hard-to-reach places.

United States Rubber Company is now a single source for every electrical tape. In addition to U.S. Royalastic, there is U.S. Holdtite Friction Tape, and U.S. Holdtite Rubber Tape. For best results use "U.S."

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

HOW WOULD YOU MOVE THIS PILE OF PARTS?



it's as costly as this

OR . . .

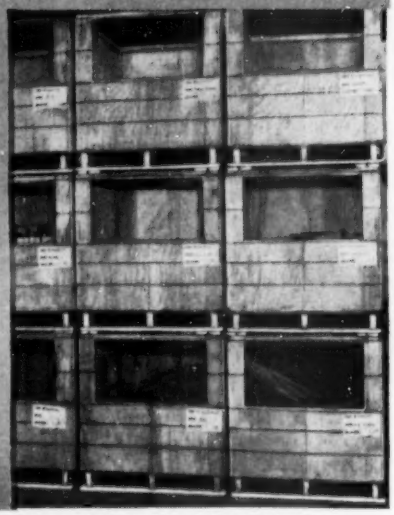
as efficient as this

Generalift

PALLET BOXES

Better check today on this versatile, popular container. The Generalift Pallet Box and fork lift truck is a combination that will substantially reduce *your* materials handling costs! Picture at right shows how many manufacturers are also using Generalift Pallet Boxes for the more economical storage of parts and materials.

Write for your free copy of "The General Box." It illustrates and describes how manufacturers are cutting container costs.



AMERICA'S FINEST INDUSTRIAL PACKAGING LABORATORY

It is here where more efficient containers are born. We will be glad to study your problem and design a container that best meets your specific needs. Write for complete details.

General BOX COMPANY

GENERAL OFFICES: 1807 Miner St., Des Plaines, Ill.

DISTRICT OFFICES AND FACTORIES: Cincinnati, Denville, N. J., Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, Sheboygan, Winchendon. General Box Company of Mississippi, Meridian, Miss. Continental Box Company, Inc. Houston, Dallas

ENGINEERED SHIPPING CONTAINERS FOR EVERY SHIPPING NEED

★ Wirebound Crates and Boxes ★ Generalift Pallet Boxes ★ Generalite Beverage Cases ★ Cleated Corrugated and Watkins-Type Boxes ★ All-Bound Boxes ★ Corrugated Boxes

MISCELLANEOUS EQUIPMENT

Begins on page 204

Self-Broaching Bushing

The new Aeroquip bushing has a broached outer surface that creates dozens of hard cutting edges. You can force bushing into parts made of cast metal, plastics, steel, and other metals without the need for close-tolerance press fits. You are allowed greater variation in hole sizes because Aeroquip literally cuts its own way into position with uniformly accurate results.

Bushings are made of hardened steel treated with a black oxide penetrate that prevents rust and corrosion. They will work satisfactorily with maximum tolerance of 0.002 of an inch.

Aeroquip Corp., Jackson, Mich.

■

For Cold Feet

Good news for your outdoor employees! The new Thermoboot, which has proven itself under the most adverse weather conditions with our armed forces in Korea, is now available for civilian use. Thermoboot utilizes wool and dead air space to insulate the foot from cold. It offers absolute protection against frost bite and is completely waterproof. Available in sizes 5 to 14 in three types: SZH-40 for temperatures from −10F. to −60F., SZ-40 for −40F. to +60F., and HL-5 low-temperature, hip-length waders.

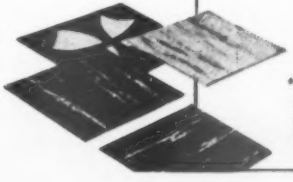
Techno Efficiency Council, 1 Hanson Pl., Brooklyn.

Turn to page 209

Should flooring problems be dropped on the company president's lap?

FLOORS can be a sound investment—or an overly-costly expenditure—depending on how well suited they are to the area where used. For example, a corridor requires certain qualities in a floor ...cafeterias present totally different flooring problems...basement utility rooms must meet still other standards.

And, because maintenance costs, public approval and over-all profits are affected, you'll benefit by calling in a Kentile Flooring Contractor—to make sure the floors you choose are the right floors...the floors that will last the longest...look the best... for the smallest cost.



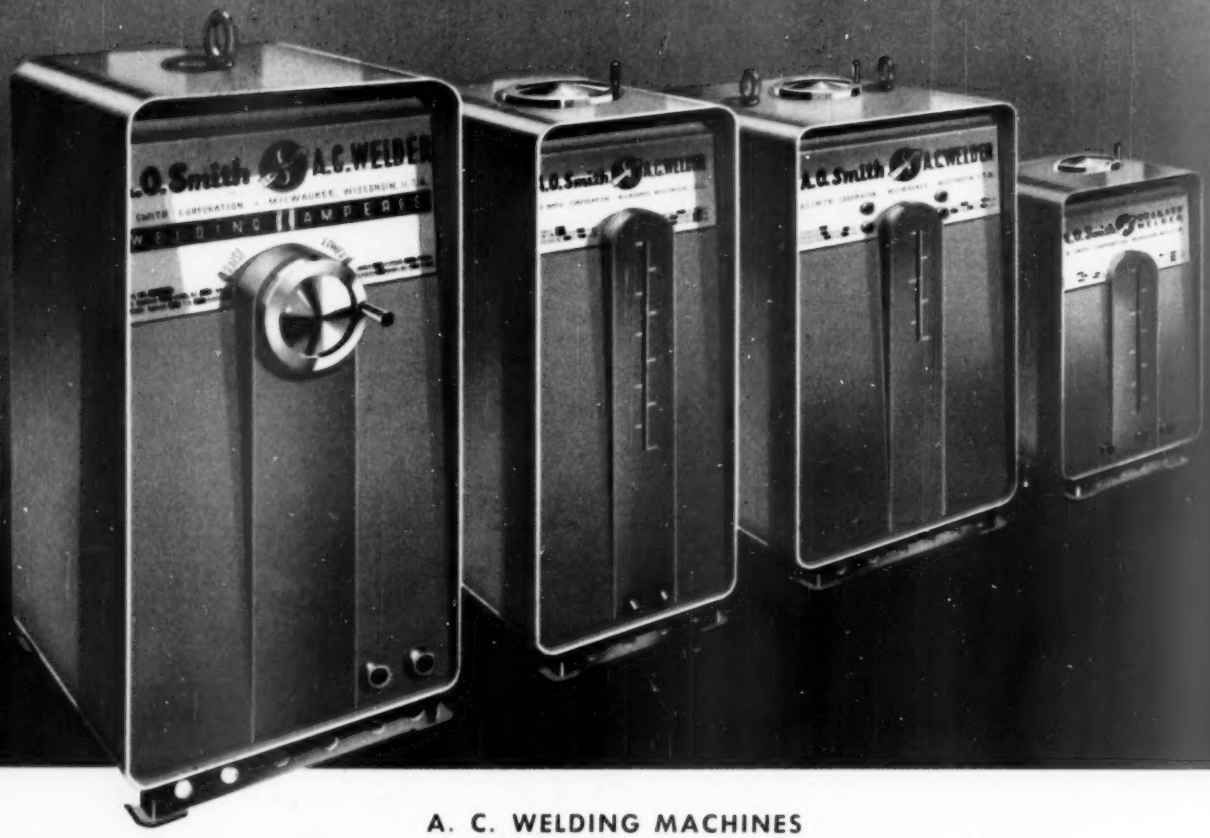
Call the Kentile Flooring Contractor* for up-to-date information about these floors

- ✔ *KENTILE ASPHALT TILE*
- ✔ *KENRUBBER TILE FLOORS*
- ✔ *KENCORK FLOORS & WALLS*
- ✔ *SPECIAL greaseproof KENTILE*

KENTILE INC.

*If you don't know the name of your Kentile Flooring Contractor look under FLOORS in your Classified Phone Directory or write Contract Dept., Kentile, Inc., 58 2nd Ave., Brooklyn 15, N. Y.

new era in welding!



A. C. WELDING MACHINES

Heavy-Duty CHAMPION

300-, 400- and 500-Amp. Production Welding Models. The extra years of service built into these machines make these models real welding champions.

The CHALLENGER

200-, 300- and 400-Amp. Production Welding Models featuring wide amperage range for adaptability to more jobs in any production welding shop.

The AUTO-MAN

650-Amp. Model. For Automatic or Manual Operation, singly or in multiple set-ups. Offers unusual flexibility for your welding requirements.

The UTILITY

An all-purpose Utility welder with 25 to 180 Amp. range for repair-shop, maintenance and farm use, and featuring production welder construction.

Made by Welders . . . for Welders

Production proved by one of the world's largest users of welding products

Now A. O. Smith advanced design . . . new plus features . . . give you the latest in welding machine efficiency

D. C. WELDING MACHINES

The D. C. RECTIFIER

200-, 300-, and 400-Amp. heavy-duty Production Welding Models for all d.c. jobs. The *one* rectifier-type welder designed to eliminate stack failure!

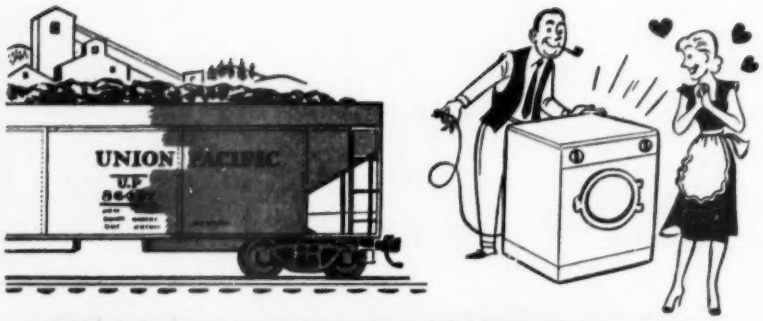
The FIELD KING Gasoline-Engine

200- and 300-Amp. Models. The most advanced of all engine-driven welding machines! Built for rugged jobs in the field. Welds with new speed and ease.

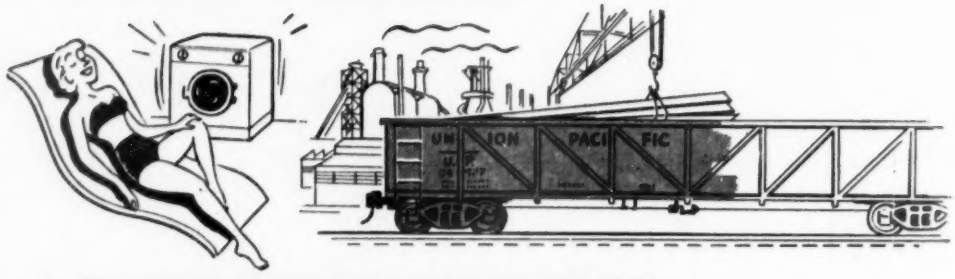
A.O.Smith
WELDING PRODUCTS

Redesigned to match *today's* welding requirements, *A. O. Smith advanced design welders* offer you the advantages of improved construction, top welding performance, and more operating benefits. A. O. Smith welders put you in the best position to cope with today's requirements and costs. Whether your welding is manual or automatic, A. C. or D. C., A. O. Smith welders assure you of having the finest power source available anywhere.

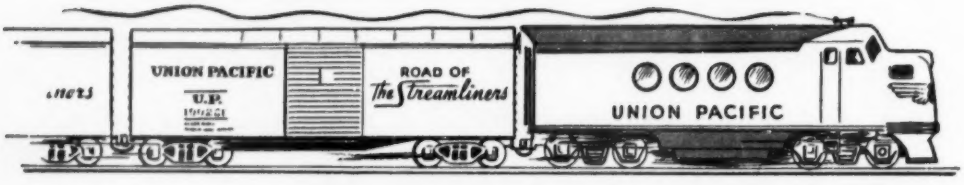
Ask your A. O. Smith representative, your A. O. Smith distributor or write us, for full details about these advanced design welding machines. *They merit your study.* A. O. Smith Corporation, P. O. Box 584, Milwaukee 1, Wisconsin.



To keep the little woman gay,



To lighten up her chores,



U. P. gives service all the way

UNION PACIFIC RAILROAD

From mines to dealers' doors.

The magic of American industry converts the earth's treasures into time-and-work-saving devices that lighten household tasks and make possible more hours of leisure and enjoyment.

The magic of American railroading transports the raw materials to industrial plants... also provides a safe, dependable means of shipping the finished products to distributors and dealers.

UNION PACIFIC RAILROAD

(Offices in 70 cities throughout the U. S. A.)

Begins on page 204

Strapping Unit Attaches to Belt

Both your hands are free when you wear this handy, lightweight belt unit designed to carry strapping, tools, and seals. Called Beltbinder, unit includes three containers suspended from belt in convenient positions and with even distribution of weight.

One container holds a newly designed expandable carton with a 200-ft. coil of strapping which you can easily dispense at waist or thigh level. Leather pocket holds hammer-cutter, and canvas pouch holds strapping tool and supply of seals.

A. J. Gerrard & Co., 1950 Hawthorne Ave., Melrose Park, Ill.

■

Non-Slip Handwheel

Four finger-spaced lugs give your operator a firm comfortable grip on the new Non-Slip Handwheel, even though his hand may be wet or greasy. Lugs are continuations of the strong spoke structure projecting from the stem hub through a rugged octagonal frame.

Assures complete, tight closing to prevent leakage, a common cause of valve erosion, wire drawing, and failure.

The Lunkenheimer Co., Cincinnati 14, Ohio.

Turn the page

THE
MULTI-CLEAN
Motorized Sweeper

Cleans 12 miles of warehouse aisles in *6 HOURS!*

THIS IS THE AMAZING RECORD achieved by one man and the new, improved Multi-Clean Motorized Sweeper in a large paper products plant. It formerly took 3 men with push brooms 8 hours to sweep these 8-ft. concrete aisles. Now, one man is able to do the heaviest sweeping jobs better and in a fraction of the time required by the old-fashioned push broom method.

THE MULTI-CLEAN MOTORIZED SWEEPER cleans up dirt, dust, steel shavings, paper, grass, small metal parts and milling debris thoroughly and economically. It is ideal for cleaning floors in large factories, warehouses, commercial buildings, and for sweeping parking lots, freight docks, sidewalks, streets and alleys.

SWEEPING IS DONE BY 8 STURDY 36-inch hardwood, Palmyra filled brushes welded into a single circular unit. Effective sweeping width is increased to 48-inches by use of a side brush attachment. The built-in vacuum is mounted directly on the engine shaft. A Briggs & Stratton air-cooled engine delivers adequate power to operate the sweeper and pull the operator on the riding sulky.

GUARANTEE: THE MULTI-CLEAN MOTORIZED SWEEPER is guaranteed for a period of one year against defects in material and workmanship. Its trouble-free service, easy operation and low price make it the best buy in the motorized sweeper field.

**1 MAN
WITH MOTORIZED SWEEPER
EQUALS 20 MEN WITH BROOMS**

LET US SHOW YOU HOW THE MULTI-CLEAN MOTORIZED SWEEPER CAN WORK FOR YOU!

MULTI-CLEAN PRODUCTS, INC.

MAIL THIS COUPON TODAY!

MULTI-CLEAN PRODUCTS, INC.
2277 Ford Parkway, Dept. FM-2, St. Paul 1, Minn.
Send me more information on the Multi-Clean Motorized Sweeper.

*Name*_____
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Insist on Genuine Multi-Clean Attachments and Replacement Parts

When you need *Thyratrons* specify *RCA*

For prompt service on RCA Tubes call your local RCA Tube Distributor

RCA Thyratrons help to prevent costly shutdowns

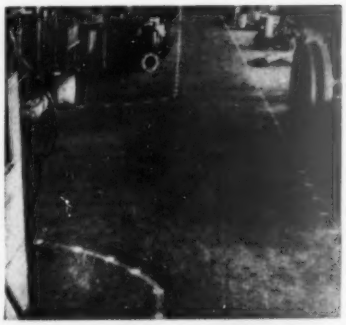
As a result of rigid quality control methods and stringent tests, RCA Thyratrons provide reliable performance even under tough service conditions. You get *Performance Security* with RCA Thyratrons. This means extra hours of service . . . fewer shutdowns of equipment due to tube troubles . . . equipment operation at higher efficiency.

TECHNICAL INFORMATION FOR YOUR REFERENCE

The 20-page booklet "RCA Power and Gas Tubes" contains technical information on a wide line of thyratons — gas and mercury-vapor types, triodes and tetrodes, miniatures and jumbo sizes. For your FREE copy write to: RCA, Commercial Engineering, Section 71AT, Harrison, N.J., or obtain a copy from your local RCA Tube Distributor.

RCA® RADIO CORPORATION of AMERICA
ELECTRON TUBES HARRISON, N.J.

Begins on page 204



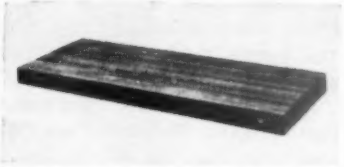
For Marking Traffic Lanes

Bright yellow or white plastic disks for lane marking save you time and money by eliminating need for repainting. They last 2 to 5 years under heavy plant traffic, maker claims.

Tapered up to a ¼-in. high center, discs warn your vehicle operators by feel as well as sight. And they resist effects of oil, grease, hydrocarbons, or ordinary cleaning solvents.

The Campro Sales Co., Industrial Products Div., 1300 Fourth St., S.W., Canton, Ohio.

■



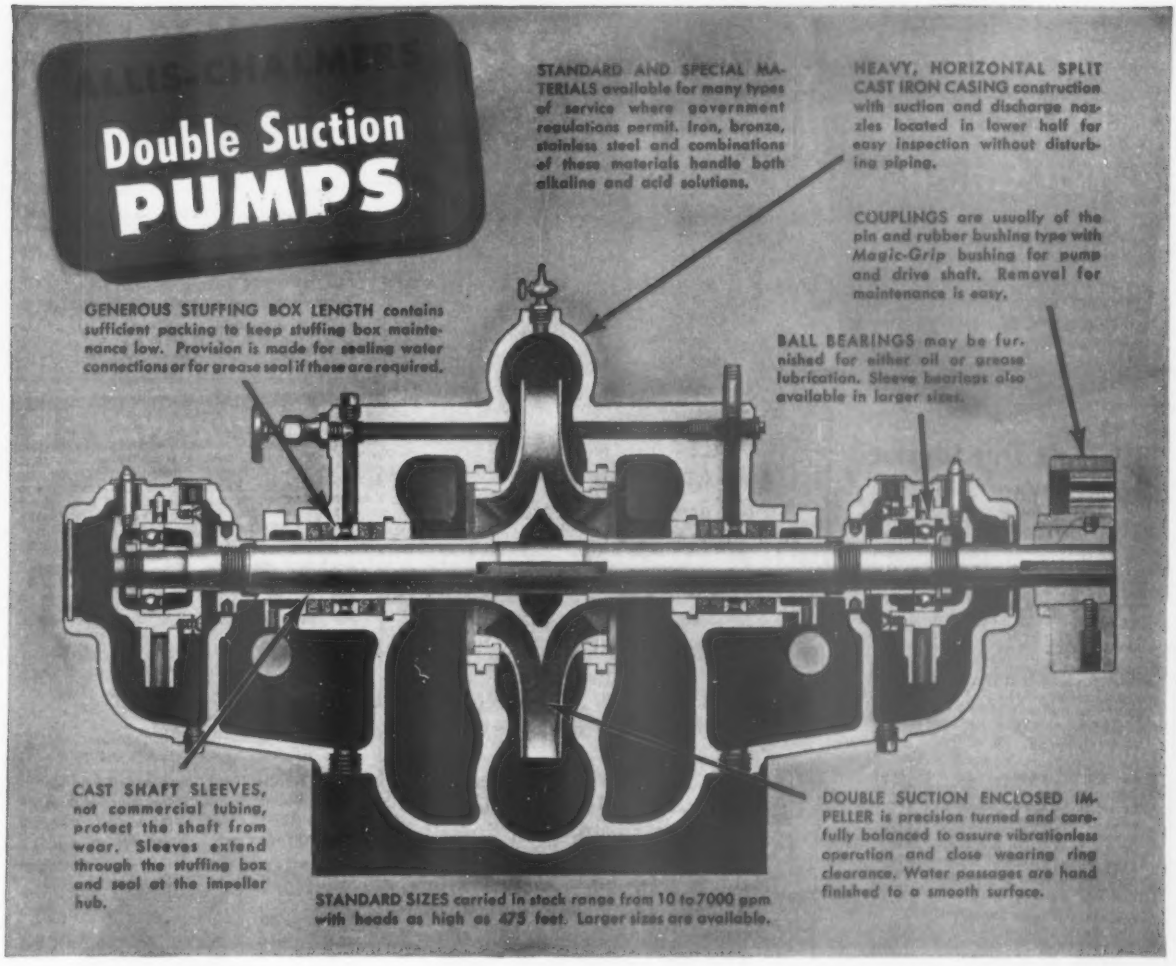
Laminated Hard Maple Bench or Table Top

Known as the Tolco 100B, this unit will withstand the most severe usage. Gives you a stronger, straighter, flatter bench or table top because all pieces of edge-grained hard maple used are carefully selected and machined to close tolerances.

Pieces are then electronically glued in pneumatic radio presses to produce the most perfect type of laminated top, says the manufacturer.

Tolerton Co., 265 N. Freedom Ave., Alliance, Ohio.

Turn the page


Double Suction PUMPS
STANDARD AND SPECIAL MATERIALS available for many types of service where government regulations permit. Iron, bronze, stainless steel and combinations of these materials handle both alkaline and acid solutions.
HEAVY, HORIZONTAL SPLIT CAST IRON CASING construction with suction and discharge nozzles located in lower half for easy inspection without disturbing piping.
COUPLINGS are usually of the pin and rubber bushing type with Magic-Grip bushing for pump and drive shaft. Removal for maintenance is easy.
GENEROUS STUFFING BOX LENGTH contains sufficient packing to keep stuffing box maintenance low. Provision is made for sealing water connections or for grease seal if these are required.
BALL BEARINGS may be furnished for either oil or grease lubrication. Sleeve bearings also available in larger sizes.
CAST SHAFT SLEEVES, not commercial tubing, protect the shaft from wear. Sleeves extend through the stuffing box and seal at the impeller hub.
DOUBLE SUCTION ENCLOSED IMPELLER is precision turned and carefully balanced to assure vibrationless operation and close wearing ring clearance. Water passages are hand finished to a smooth surface.
STANDARD SIZES carried in stock range from 10 to 7000 gpm with heads as high as 475 feet. Larger sizes are available.

Built for LONG LIFE

HEAVY DUTY CONSTRUCTION—no skimping, no corner cutting—is what you can look for in Allis-Chalmers Type S pumps. Extra metal thicknesses, extra strong parts, extra construction features, and extra careful workmanship are always there to give you long life, low maintenance and low cost per gallon pumped.

Every Allis-Chalmers double suction pump is carefully tested on the most modern pump testing equipment in the industry. Each installation is individually engineered by men whose experience in thousands of pump installations will give exactly the right pump for your needs.

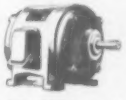
Allis-Chalmers can take full responsibility for your pumping operation because Allis-Chalmers can furnish the complete installation — pump, motor, control and drive—all built of coordinated design by one manufacturer. Efficient operation is assured and maintenance costs are kept low.

Whatever your pumping problem, call your nearby Allis-Chalmers Authorized Dealer or District Office. Or write to Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 08B6146. A-3580

Texrope, Vari-Pitch and Magic-Grip are Allis-Chalmers trademarks.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.



MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

FREE slide films on pump theory, application and maintenance.
Ask your Allis-Chalmers representative.

ALLIS-CHALMERS

It's What USERS Say that Counts!

Today business requires more than city telephone service. It needs SELECT-O-PHONE! . . . Read what Mr. Susen, Vice President of Phoenix Dye Works, says about SELECT-O-PHONE benefits.

Phoenix Dye Works
YARN DYERS AND BLEACHERS
1963-71 SOUTHPORT AVENUE
CHICAGO 14

SELECT-O-PHONE Division,
Kellogg Switchboard & Supply Co.
79 West Monroe Street
Chicago 3, Illinois

Gentlemen;

About our Select-O-Phone system: It's hard to see how we ever got along without it. It's a time-saver and a money-saver. It has proved invaluable in expediting—in better routing of orders.

Select-O-Phone takes the load off our switchboard—leaves it free for incoming and outgoing calls. It permits us to talk privately with department heads—to get information quickly for customers, while "holding" outside calls. With Select-O-Phone we can have conferences among executives without any of us leaving our desks.

Select-O-Phone has done away with the annoyance of loud speakers. It prevents private information leakage. Maintenance costs have been remarkably low. From our own experience, we highly recommend Select-O-Phone as a modern and efficient tool of business.

Very truly yours,
PHOENIX DYE WORKS

Vice President

ATTENTION DEALERS!
Some exclusive territories still open. Write for particulars.

KELLOGG — An IT&T Associate —
Select-O-Phone
An Associate of International Telephone and Telegraph Corp.

GET THE FACTS

Mail coupon NOW for complete information explaining how SELECT-O-PHONE automatic communication systems will save you money.
Address SELECT-O-PHONE Division, Dept. 12-B, Kellogg Switchboard and Supply Co.
79 West Monroe Street, Chicago 3, Illinois

Name .....
Company .....
Address .....
City ..... Zone .....
State .....

MISCELLANEOUS EQUIPMENT

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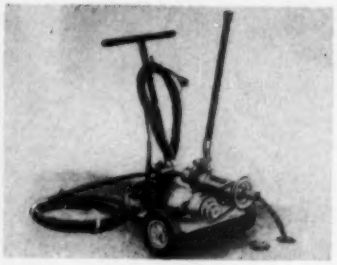

One-Man Unit For Sewer Cleaning

This 1-man unit, called Flexi-Cleaner, can save you time and money on your emergency and maintenance sewer-cleaning.

Flexi-Cleaner is powered by an electric motor and has an extra-heavy coil rod, with a coupling at every 25 feet for safe, quick, and easy operation.

An automatic cable-feeding mechanism enables operator to stand behind machine.

Unit can be operated either right or left, has a 25-to-1 gear reduction ratio, and has three speeds—125, 250, and 500 rpm.

Flexible Sewer-Rod Equipment Co., 9059 Venice Blvd., Los Angeles 34.

■

Industrial Wheel

You can get maker's rubber-tired wheels in capacities ranging from 230 to 1140 pounds. They are equipped with cylindrical roller bearings which are lubricated through a 5/16-in. drive-type grease fitting.

High-tensile, solid rubber tires are puncture-proof and tear-resistant. They're molded permanently to the wheels and are designed for easy rolling or swiveling when used with castered wheels.

Sizes to fit a variety of plant rolling equipment—from small hand trucks to heavy industrial trailers.

Phillips Mine & Mill Supply Co., 2324 Jane St., Pittsburgh 3.

WHERE TO BUY

Pipe Repair CLAMPS
Made for every type of leak—any temperature or pressure. Send for Catalog No. 41-O.
M. B. SKINNER CO., SOUTH BEND 21, INDIANA

For FREE Sanitary Survey
OF YOUR PREMISES CONSULT YOUR DOLGE SERVICE MAN OR WRITE:
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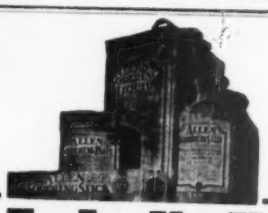
STOP that WATER
With FORMULA NO. 640, a clear liquid which penetrates 1" plus in concrete, brick, stucco, plaster, etc. Seals out water, dirt. Holds 20' head. Use outside and in. Preserves all absorbent materials. Sold 14 years. Quick, economical, sure. $3 in 55's. Free sample. See Sweet's.
HAYNES PRODUCTS CO., OMAHA 3, NEBR.

STOP DUST
DUSTKOPS
UNIT TYPE
LOW COST
22 Models
300 cfm to 10,000 cfm
¼ hp to 15 hp
AVAILABLE FROM STOCK
For: Grinders, buffers, polishers, woodworking, lint . . . ALL DUSTS
Send for Cat. 605I; describe problem for recommendation by return mail, without obligation
AGET-DETROIT CO. • ANN ARBOR, MICH.



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SODERING, BRAZING, WELDING
L. B. ALLEN CO., INC.
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TECH CLAMP Pat.
A Quick Acting-Adjustable Holding Device

PORTABLE
RAPID SETTING
PRECISION FIXTURE

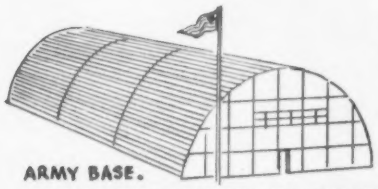
PRICE: $14.75 — F.O.B. BOSTON
TIME SAVER—Quick Clamping Action—Eliminates Slow Threading.
ECONOMICAL—Nominal Priced Tool Produced in Quantity.
CUTS COSTS—Portable Multi-Operation Holding Fixture.
HIGHER PRODUCTION—Fast Clamping Of Difficult Shapes With Variable Pressure Control.
Specifications—Weight: 10 lbs., Length 13½", Width: 3", Jaw Height: 1⅝", Max. Jaw Opening 3¼". Machine Ground Top, Bottom & Holding Side Working Surfaces.
Mfd. by TECH-CLAMP CO., Inc.
177 State St., Boston 9, Mass.
Telephone: CApitol 7-1614

NOTES FROM AN ENGINEER'S SKETCH PAD

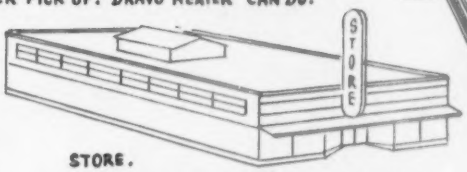
LOOKS LIKE THAT VERSATILE DRAVO "COUNTERFLO" HEATER CAN BE USED ON PRACTICALLY ALL OUR JOBS.

SCHOOL.DISTRICT BUDGET LIMITED. CAN SAVE WITH DRAVO HEATERS.

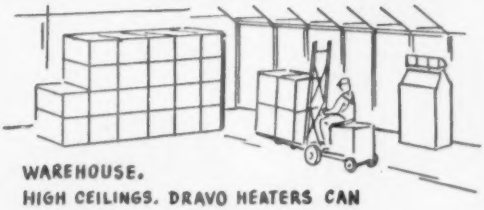
CHURCH. INTERMITTENT HEATING. NEEDS QUICK PICK-UP. DRAVO HEATER CAN DO.



ARMY BASE.
WINTER CONSTRUCTION ON THESE BARRACKS. CAN INSTALL DRAVO HEATERS EARLY FOR HEAT DURING CONSTRUCTION AND AFTER COMPLETION.



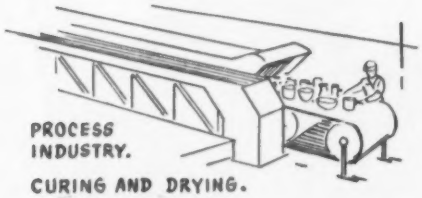
STORE.
WITH DRAVO HEATERS, CAN USE ONE SET OF DUCTS FOR HEATING AND AIR-CONDITIONING.



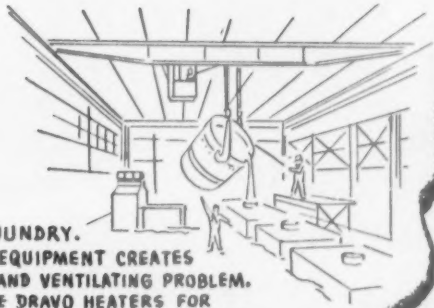
WAREHOUSE.
HIGH CEILINGS. DRAVO HEATERS CAN REDUCE ROOF HEAT LOSS, KEEP HEAT WHERE IT'S NEEDED.

DIESEL RAILROAD SHOP.
NEEDS HEAT AT WORKING LEVEL.
DRAVO HEATERS IDEAL.

INDUSTRIAL PLANT.
DRAVO HEATERS HAVE 150' AIR THROW.
NO DUCTS NEEDED.



PROCESS INDUSTRY.
CURING AND DRYING.
SPECIFY DRAVO HERE.



FOUNDRY.
EXHAUST EQUIPMENT CREATES HEATING AND VENTILATING PROBLEM.
USE DRAVO HEATERS FOR TEMPERED "MAKE-UP" AIR.

A case study on any [illegible] installations is yours for the asking. For complete information on how Dravo "Counterflo" Heaters can help solve your heating problems, write for Bulletin LM-52 -35

DRAVO CORPORATION

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Here's why most control center buyers specify Westinghouse

Why this mass preference? It all boils down to matching product to need. Close co-operation with industry, exhaustive tests and constant improvement have produced this control center which matches industry's every need. Here are the product features that make Westinghouse Control Centers the MOST PREFERRED control centers:

FLEXIBILITY

Westinghouse Control Centers have complete flexibility to match the periodic movement, substitution and addition of machines—flexibility of electrical components—flexibility of structural units. All cubicle units are built to a standard 14" module—are completely interchangeable. Vertical structures are standardized and free-standing—can be moved or added at any time.

EASIER SERVICING

There is no maze of mechanical obstacles on a Westinghouse Control Center. A few twists of a screw driver and your serviceman is ready to go to work. Guide rails simplify removal and insertion of cubicles. All starter units are front wired. Side baffles are removable for easier wiring. Sectional and master terminal boards speed hook-up work.

POSITIVE SAFETY

Westinghouse Control Centers protect *both* personnel and equipment. The Westinghouse "Magnagrip®" stab connectors and tilt-out disconnect position assure a "dead" unit for servicing. Unit door remains on structure to cover hot buses when starter unit is removed. Tested baffling prevents explosive chain reactions if faults occur. Each starter has an interrupting capacity of not less than 15,000 rms amps.

Complete details on these and other important features are contained in the Control Center Booklet B-4213. Ask for your free copy. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-27021-A

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AMERICAN MUTUAL

Service from salaried representatives in 78 offices!
Savings from regular substantial dividends!

GROUP ACCIDENT AND HEALTH-HOSPITALIZATION . . . . WORKMEN'S

TO CARE FOR 60 WOMEN

By Mr. Friendly

There are 60 women in Frisby's life.
(Sixty-*one,* if you count his wife!)
He cares for them in splendid fashion,
Which, let us add, involves no passion!

He chooses their clothes, their hats, their shoes,
Something *most* women would greet with boos!
Why do they like 'em—why do they warem?
Who are these girls in Frisby's harem?

They're employees. They work and toil
And he protects the woiking goil.
With safer jobs and safer dress,*
Safety's something he knows bess!
(Poetic license No. 3658)

***NEW 44-PAGE FREE BOOK TELLS HOW TO PROFITABLY, SAFELY EMPLOY WOMEN**

Vital, valuable information regarding safe, efficient employment of women is now available to executives in the comprehensive free book, "Women in Industry."

Here are just a *few* of the carefully-detailed chapters: *Women—A Key to Safety in Industry and at Home; Recommended Standards for the Employment of Women; Selection and Placement; Special Facilities and Equipment for the Employment of Women; Safety for Women; The Importance of Records in the Plant Medical Program.*

But act at once. Our supply is limited. For your free copy of "Women in Industry," write today to: American Mutual Liability Insurance Co., Dept. F-46, 142 Berkeley Street, Boston 16, Massachusetts.

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SIGNIFICANT DEVELOPMENTS IN PRACTICAL LABOR RELATIONS

TOLD IN BRIEF FOR BUSY FACTORY EXECUTIVES

By **PAUL A. KING**, *Attorney, Bigelow-Sanford Carpet Company, Inc. Member, New York Bar.*

WORKERS BUY MORE FOR LESS HOURS. *Despite high prices, workers are away ahead.* . . . . . **Page 218**

SLOWDOWN MAY EXCUSE REFUSAL TO BARGAIN. *Slowdowns don't have protection of law, so you can bear down.* . . **Page 218**

CAN YOU REGULATE WORKERS' PRIVATE LIVES? *Here are some clues as to how far you can legitimately go.* . . . . . **Page 218**

NEW RULING ON SELF-INSURANCE. *This new tax law interpretation means a lot if you're self-insured.* . . . . . **Page 220**

WHEN IS A WORKER ASLEEP? *The answer's not as simple as you might think.* . . . . . **Page 222**

COMPANY DEATH BENEFITS TAX FREE UP TO $5000. *They may be exempt from income tax. Better check.* . . . . . **Page 224**

LIMITS ON RIGHT TO FIRE. *Even when you're not unionized, there are definite limits on your right to fire worker.* **Page 226**

BRIEF BUT IMPORTANT. *Veteran Seniority . . . Voting Rules . . . Caution on Bonuses . . . "Stabilization" Strikes . . . Cafeteria Price Control.* . . . . . **Page 228**

Workers Buy More for Less Hours

According to a National Industrial Conference Board survey, the American worker is putting in less hours today to fill his "market basket."

The Board reports that the wage earner in 1914 had to work 572 hours to purchase a market basket which cost the 1952 worker only 309 hours.

The market basket is filled with 31 comparable common foods, clothing, household articles, and other items. It cost the 1929 worker 486 hours of work, according to the NICB survey.

Slowdown May Excuse Refusal to Bargain

The National Labor Relations Board is pretty tough about an employer's duty to bargain with the union. But sometimes it will excuse him from this duty. For example, when the union orders a slowdown during negotiations.

Thus, the Board recently ruled that the Phelps Dodge Copper Products Corp. was not guilty of an unfair labor practice when it stopped negotiations during a slowdown.

A slowdown, incidentally, is not a protected activity under the law. The Board feels that acceptance of pay without full production is not the right way for a union to make its point. Not being protected, slowdown participants may be fired.

Can You Regulate Workers' Private Lives?

How far can an employer go in regulating the private lives of his workers? Answer: If what an employee says or does outside of the company injures the business or reputation of the company, the employer stands a good chance of telling him off. That is, his action will be upheld if the case goes to arbitration.

For example, a couple of months ago the Iowa State Employment Service ran a public meeting designed to get the help of the Des Moines women's club in meeting the stenographic and

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— says Foreman of
BURNY BROS. BAKERY, CHICAGO

Garage and stockroom floors in Burny Bros. large, modern bakery get daily scrubbing with a *Job-Fitted Combination Scrubber-Vac* and *Setol Cleanser*

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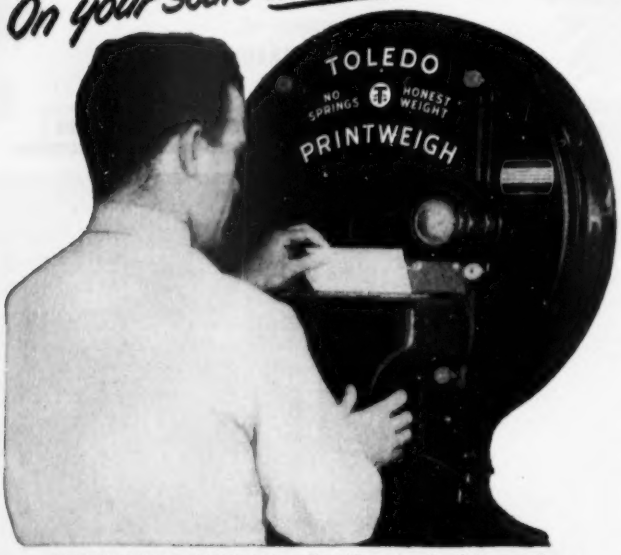
On your scale material becomes money!



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Modern Toledos meet your needs today for *rapid, accurate* scales in all phases of production . . . to help you *control costs*!

In providing basic production, receiving, stock or shipping information—the scale is doing an accounting job—on the scale! Every time you weigh, material becomes money! That's why today it is more important than ever to KNOW weights are right—every time.

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HEADQUARTERS FOR SCALES

PRACTICAL LABOR RELATIONS

Begins on page 218

clerical help shortage. At the meeting, an employee of Northwestern Bell Telephone, who happened also to be a union official, made disparaging cracks about his company's wage and personnel policies. He was fired.

An arbitrator upheld the discharge. Union activity was no excuse where the meeting was a public one.

But the arbitrator might have excused the comments had the meeting been a union meeting.

New Ruling on Self-Insurance

Are you a self-insurer under a state disability law? Do you furnish your employees accident or health benefits without an insurance company? That is, do you make the payments yourself? If so, this recent Treasury Department ruling will mean much to you.

The tax law provides that payments received through accident or health *insurance* are not part of an employee's income. Therefore, the employer does not have to withhold any part of the payments under the withholding tax provisions of the law. But if the plan is *not* a true insurance plan —then the employee must report the payments as income, and his boss must withhold taxes.

For example: The Treasury Department ruled that the following plan was *not* a "plan of insurance":

1. The employer paid the entire cost.
2. It was approved under New York and New Jersey disability benefit laws.
3. All employees were covered.
4. Hourly workers had to wait three days.

Turn the page

For Faster Materials Handling . . .

There's a **POWELL** Quick Emptying

Container To Fit Every Kind of Job

You can't beat quick emptying containers if you want faster materials handling . . . and you can't beat Powell when it comes to quick emptying containers. Pictured here are only a few of the many styles and types of quick emptying containers designed and built by Powell.

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Backstand Belts save 2 hours per day!

Armour Backstand Belts save 2 full hours per operator per day for steel tube company*

In removing burrs and grip marks from steel tubing, a well-known company* found they saved more than just the two hours per day operators had been given to make set-up wheels. Backstand belts outlast 4 to 5 set-up wheels—and without dressing they remain flat and true. And backstand belts give a better finish, due to their uniform grit.

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PRACTICAL LABOR RELATIONS

Begins on page 218

5. Full pay was given for off-the-job disabilities.

6. The difference between full pay and workman's compensation was given for on-the-job disabilities.

7. The employer had sole discretion as to who got benefits, and power to terminate the plan (within state law limits).

8. Benefits were not paid from an independent fund.

9. Benefits were not paid by an insurance company.

The plan was not insurance because of the employer's discretion (item 7) and because amounts weren't paid through an independent fund or insurance company.

When Is a Worker Asleep?

Can you tell when one of your workers is asleep? Don't be so sure.

The director of one plant noticed an employee stretched out on his back with his head and arms leaning against a truck. He was motionless, his eyes were closed. It looked to the director as if he were asleep. When the director fired the "sleeper" and the case came before an arbitrator, he stated he was merely resting. The arbitrator took his word for it. Said the company hadn't "proved" the employee was asleep!

From some arbitrators' awards, it seems that mere idleness or closed eyes is not enough. You need corroboration. You may need to awaken the fellow. (The director merely let him sleep on until he could find the foreman. By that time he had awakened, that is ceased resting.) Or you may wait until he awakens. (*Century Foundry Award*)

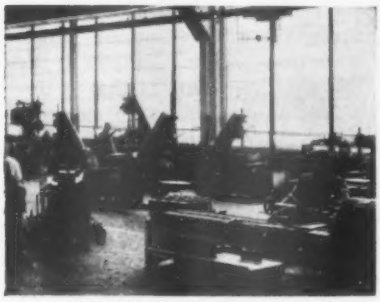
However, here's a ray of hope

Is your heating problem here?

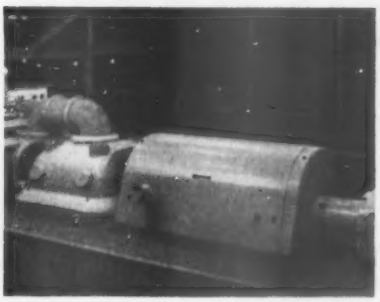
Negative pressure resulting from exhaust fans, sucks in cold air.

Drafty doorways that let in big blasts of cold air.

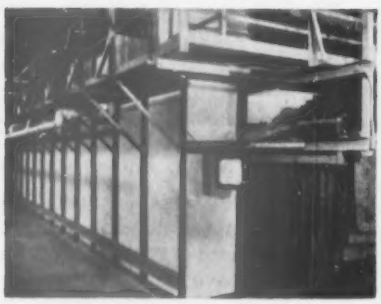
High ceilings that waste large volumes of rising heat.



Cold windows that pour chilling drafts down on the floor.



Large areas that consume excessive amounts of heat.



Processing needs that require high temperatures.

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Roof hood, with heating section optional, provides make-upair; solves negative pressure problems.

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. . . with exclusive *louver fin* diffuser, puts heat *where* it's needed, *whenever* it's needed.

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. . gives you a large volume of heated air from a handsome compact unit.

Torridor

. . . blower-type, delivers large volumes of heated air long distances, with or without ducts.

Projection Heater

. . . with exclusive *louver cone* diffuser, projects ceiling heat to floor accurately, powerfully.

Gas-Fired Unit Heater

. . . rugged, built like a boiler. Brings you new efficiency and economy in gas-fired heating.

To get the right kind of heat—choose from the line that's most complete

You'll find that these six TRANE Unit Heaters, together with the two exclusive diffusers, give you the *one right* combination for *any* unit heater application.

And that's the secret of efficient, economical heat—getting the *right* heater for the job.

See your nearest TRANE sales engineer, or write TRANE, La Crosse, Wis.

TRANE unit heaters

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Here is the exact statement of Mr. Charles F. Schmidt, Kimberly's Factory Manager:

"We want to compliment you on the superior lighting service of Lustra Incandescent Lamps in our plant. We have made extensive comparative tests with other bulbs, and Lustra lamps have proved outstanding. They burn longer, give better light and help improve plant efficiency. We wish to say, too, that our Lustra Man is right on the job and renders topnotch service."

• • • •

For greater efficiency through better lighting, and for new convenience and lowest overall lamp costs, it will pay you to talk with your local Lustra Man. He's conscientious and thoroughly qualified to solve practically any lighting problem with the complete quality line of Lustra *Double Duty* Lamps, Fluorescent Tubes and allied electrical products. Write us and we'll have him arrange an appointment. **Lustra Corporation, Dept. T-2, 36 Washington St., Brooklyn, 1, N. Y.**

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DOUBLE DUTY REFLECTOR LAMPS, INCANDESCENT LAMPS, FLUORESCENT TUBES, SPOTLITES AND FLOODLITES, RUGGED DUTY LAMPS, FLUORESCENT FIXTURES AND STARTERS

PRACTICAL LABOR RELATIONS

Begins on page 218

for you: In a very recent case Arbitrator Whitley McCoy said it didn't matter that the employee was not asleep.

He reasoned: Why waste time trying to prove the employee was asleep when "he was at least in the relaxed position where in another second or two he might have been asleep. The gist of the offense of sleeping is that it deprives the company of services which it is paying for. He started neglecting the company's business when he started the relaxation that is the beginning of sleep." Furthermore, said McCoy, the employee's posture set a bad example. (*Esso Standard*)

Company Death Benefits Tax-Free Up to $5000

A new provision of the tax law excludes from gross income $5000 of a death benefit paid by an employer to one or more beneficiaries of a deceased employee under a contract of an employer. If you or some other key employee participate in a death-benefit arrangement, you'll be interested in the proposed regulations of the Commissioner of Internal Revenue interpreting the provision.

He says:

1. Payments from a welfare plan or trust are included.
2. The benefit may be paid out in a single sum or in installments.
3. If the employer retains the principle sum and merely pays interest, the interest must be included in income tax.
4. The exemption applies to total payments by each employer of the deceased.
5. The exemption will be given to a beneficiary whether it be a partnership, corporation, or individual.
6. If the payment by an em-

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FORK LIFT TRUCKS

A MOBILIFT operator can *see* the fork ends when he picks up a load...he can *see* where he's going! There's no groping for the load...no craning around vision-obstructing cylinders. *Unlimited visibility* between Mobil-chain uprights is just ONE reason you get faster, safer, more economical materials handling with Lev-R-Matic Drive MOBILIFTS. Here are other reasons why you can handle materials at less cost with MOBILIFT:

- **Lev-R-Matic PUSH-PULL controls for forward-back movement, lifting and tilting. NO GEARS TO SHIFT.**
- **360° steering wheel makes *zero inner turning* radius possible with stand-up models.**
- **Compact design for maximum maneuverability.**
- **Easy accessibility for servicing, maintenance.**
- **Powerful 3-cylinder gas engine.**

Write for complete specifications

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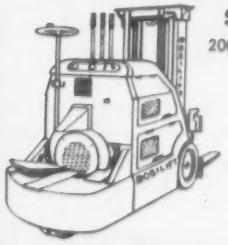

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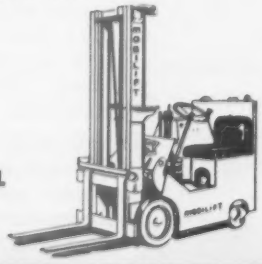
2000, 2500, 3000, 3500 lb. cap.
63", 72", 83" Masts
Special Masts to order



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63", 72", 83" Masts
Special Masts to order

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No matter where you are located—north, south, east or west—there's a Simonds distributor ready to serve you, too, with these accurately specified, quality controlled grinding wheels.

Write today for Data Book and name of your nearby distributor.

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PRACTICAL LABOR RELATIONS

Begins on page 218

ployer is shared by several beneficiaries but is in excess of $5000, the $5000 exemption is shared by each beneficiary in proportion.

Limits on Right to Fire

In some plants where there is no union, the employer operates on the basis that he can get away with firing any worker who "threatens to become a problem."

But he can't always get away with it. The law protects nonunion employees who get together to help themselves.

To illustrate: During a morning recess, one female employee met with five others outside the plant and said:

"This is a hell of a place to work. They expect one girl to do the work of five and a girl doesn't even get time to go to the ladies room."

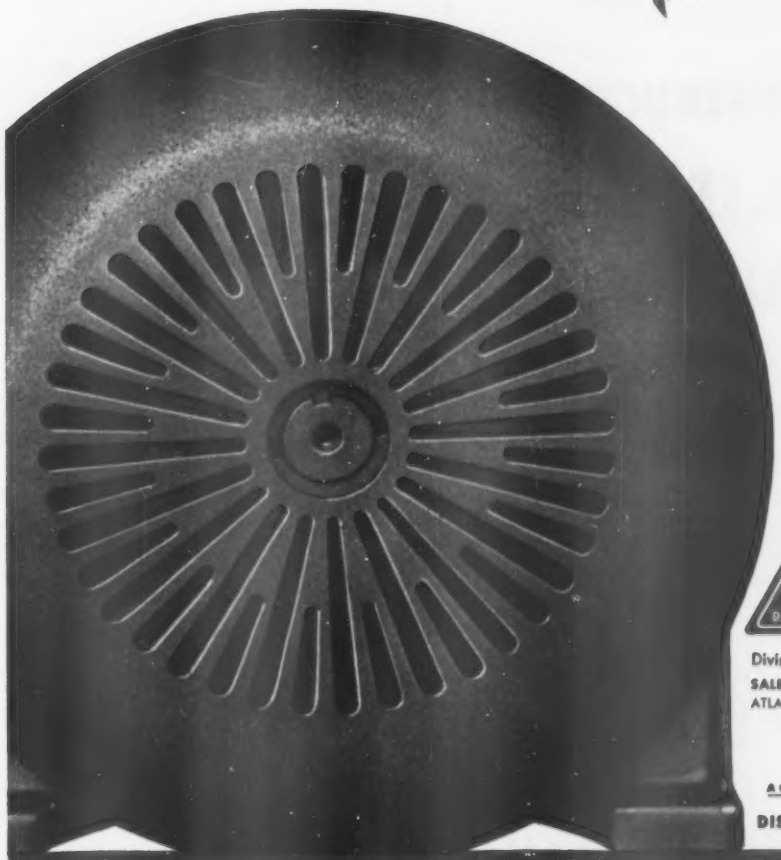
The boss heard about the comment. The girl was fired. But the National Labor Relations Board put her back on the job, pointing to paragraph 7 of the labor relations law, which permits an employee to get together with other employees for the purpose of mutual aid or protection. This girl, reasoned the Board, complained about working conditions for the purpose of inducing group action to correct a grievance. (*Office Towel Supply*)

EQUAL PAY FOR WOMEN • States aren't fooling about it. For example, in most of the following states you can be fined or jailed if you violate equal-pay laws: California, Connecticut, Illinois, Indiana, Maine, Massachusetts, Michigan, Montana, New Hempshire, New Jersey, New York, Pennsylvania, Rhode Island, Wahington. Also Alaska.

Turn the page

To know you're right... replace with

Delco Motors



You can depend on Delco motors to **keep going** in the face of the severest conditions. They are designed, engineered, and built to precision standards to minimize servicing and down-time.

When you need motor replacements—fast—call for Delco. They're available everywhere through local Delco motors distributors.

There's a Delco
for Practically Any
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Open and enclosed motors up to 100 h.p. for standard foot mountings. NEMA C&D flange-mounted motors up to 30 h.p. Explosion proof motors up to 20 h.p.

DELCO DAYTON OHIO

DELCO PRODUCTS

Division of General Motors Corporation, Dayton, Ohio

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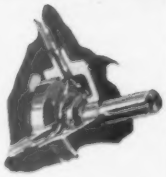
A GENERAL MOTORS PRODUCT — A UNITED MOTORS LINE

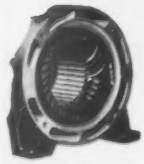
DISTRIBUTED BY WHOLESALERS EVERYWHERE

These Features tell you why you're Right with Delco

Water-Tight Conduit Box. Protects against moisture.



Positive Lubrication. Lengthens bearing life.



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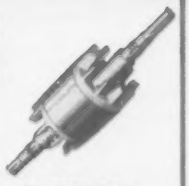
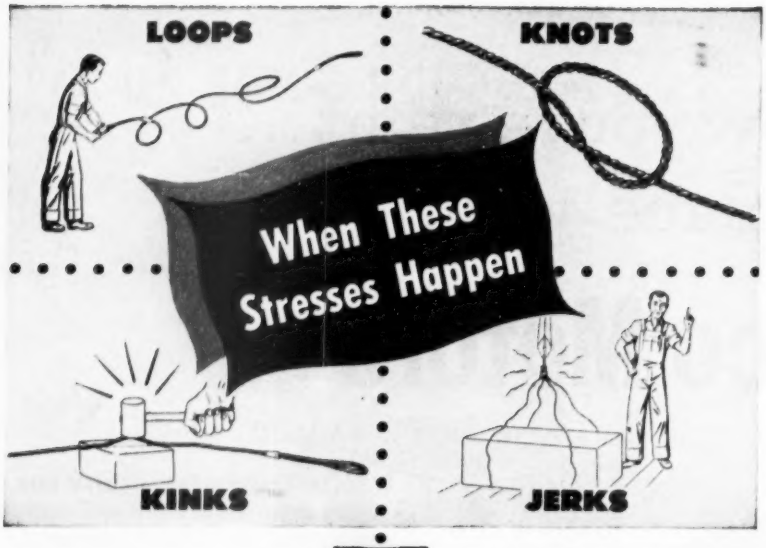


Dynamically Balanced Rotor and Shaft Assembly. Reduces vibration.

Corrosive-Resistant Cast Iron Frame. More solid, more rugged.



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PRACTICAL LABOR RELATIONS

Begins on page 218

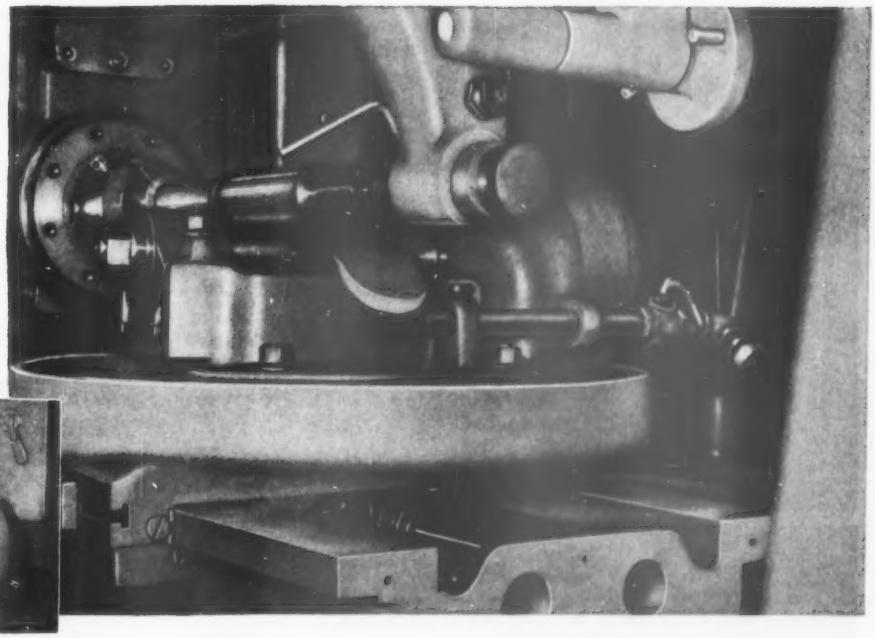
BRIEF BUT IMPORTANT

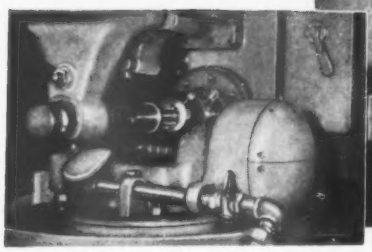
► **Veteran seniority.** A Federal District court rules that a re-employed veteran can't include time spent in the armed services when the union contract provides that "actual experience" counts toward seniority upon which pay scale is based. (*Selgrat*)

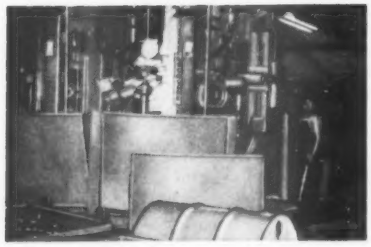
► **Voting rules.** When ballots are "marked unconventionally" in a representation election, it's customary for the NLRB to find out the intent of the voter. A balloter marked an X in the "No" box but drew and partly erased a diagonal line in the "Yes" spot. The Board kicked out the vote. A U. S. Court of Appeals kicked it back in—against the union. (*Whitinsville Spinning Ring*)

► **Caution on bonuses.** You're not through with the law when your employee-bonus has been approved by the stabilization people. There's the tax law, too. A bonus is subject to federal income tax withholding. So don't forget to check the withholding laws with your lawyer or accountant.

► **"Stabilization" strikes.** How far can a union go in striking to obtain an increase beyond salary and wage stabilization rules? NLRB rules it can strike if, in its demands, recognition is given to the need for approval—that is, if the demand is conditioned on approval. A strike is not protected by the NLRB if the demand calls for an increase before approval is secured. (*Dofflemyer Bros.*)







"ON-THE-JOB" CUTTING OIL TESTS BY CITIES SERVICE ENGINEERS!

at Timken-Detroit Axle Company

TOOL WEAR REDUCED 25%...MANUFACTURING COSTS ALSO CUT!

In an effort to reduce tool wear and cut manufacturing costs, the Wisconsin Division of Timken-Detroit Axle Company at Oshkosh called in Cities Service Engineers to make "on-the-job" tests.

Cities Service Lubrication Engineers made an on-the-spot study of the Timken-Detroit operation. This "on-the-job" evaluation by skilled Cities Service Engineers, long practiced in solving like problems, resulted in a recommendation for the use of a Chillo Cutting Oil that actually reduced tool wear 25% with proportionate savings in manufacturing costs!

WHAT ARE YOUR PROBLEMS? Why not take advantage of free, "on-the-job" testing? Call for our lubrication engineers at the office nearest you, or write Cities Service Oil Company, Dept. B-28, Sixty Wall Tower, New York City 5, New York.

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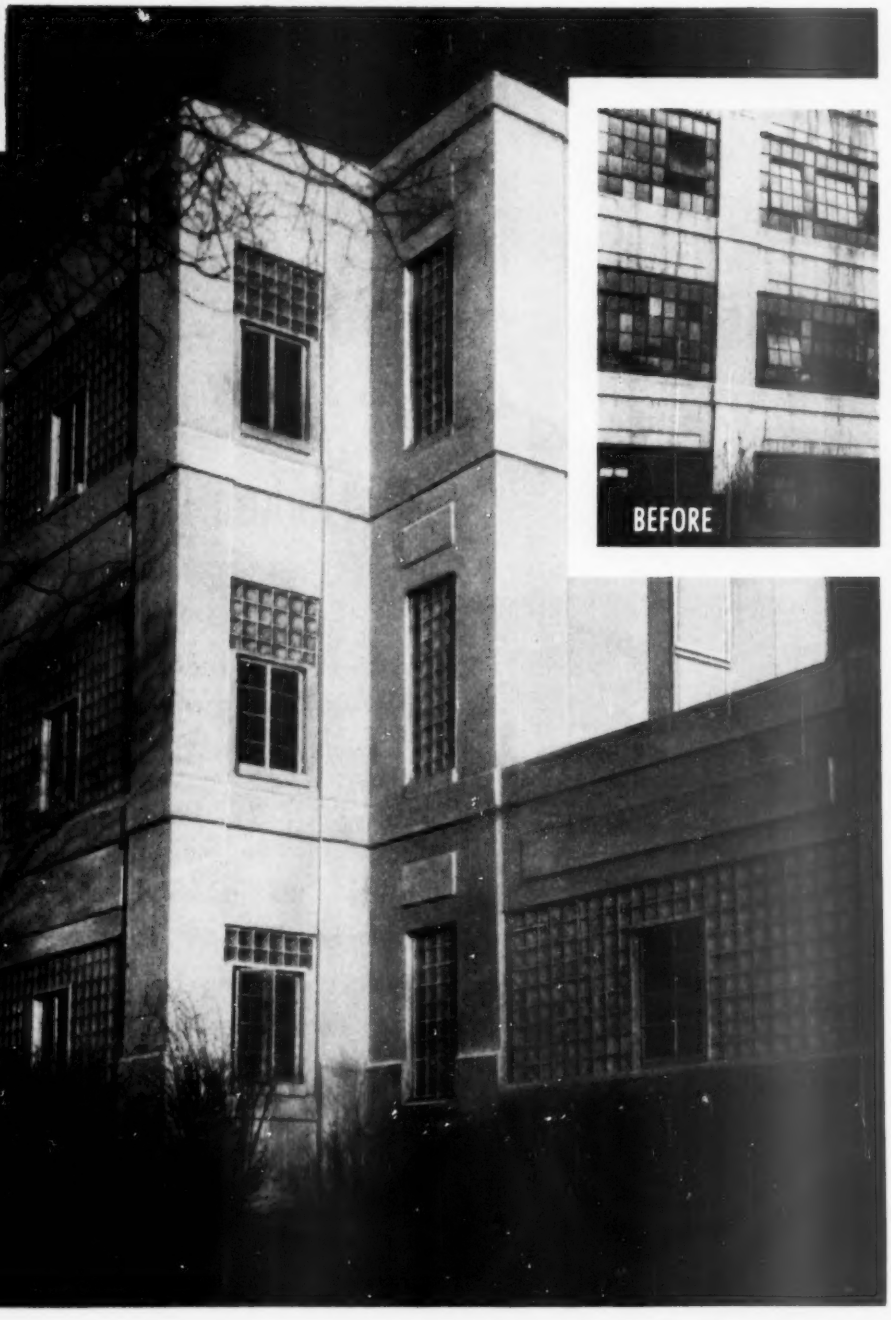
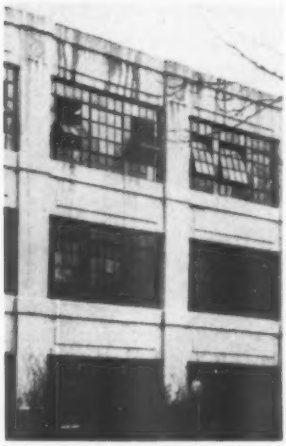
"We saved $1200 yearly on window ...increased the value

says **S. A. Norris, Jr.**
Co-Chairman, Management Committee
Homestead Valve Mfg. Co.



breakage with PC Glass Blocks of our building 25%"



EMPLOYEES complained of the drafts. Heating costs went through the roof as the wind seeped in around the warped and rusty window sash at the Coraopolis, Pa. plant of Homestead Valve Manufacturing Company.

After careful investigation, Homestead Valve found that the best way to correct these problems was to remove the old windows and install PC Glass Blocks.

Now, the breakage problem is gone. There are no more drafts, and heating costs have gone 'way down. In fact, the high insulating value of PC Glass Blocks (equal to an 8-inch masonry wall) allowed Homestead Valve to remove ⅓ of the radiators from the plant. The expensive job of painting and puttying sash and cleaning small individual panes of glass is gone, too.

PC Glass Blocks can do the same money-saving job for you and in addition, improve the morale and efficiency of your employees through improved daylighting and the elimination of drafts.

PC Glass Blocks are available in a wide range of decorative and functional patterns. The functional designs are available for above or below eye level, for northern or sunlighted elevations. They filter the daylight . . . distribute soft, glare-free illumination to all parts of the room.

Fill out the coupon and we'll send more information by return mail.

Pittsburgh Corning Corporation

PITTSBURGH 22, PA.

Only PC Glass Blocks give *all* these advantages

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- **Reduced Heating Costs**
- **Less Outside Noise**
- **Greater Privacy**
- **More Comfortable Interiors**
- **Attractive Appearance**
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Please send me a FREE copy of your booklet, "PC Glass Blocks—The Mark of a Modern Building."

☐ Send engineer to discuss specific problem.

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"Whips Trouble Spots" Say users of these *Life-Lines*

"Neither Vibration Nor Moisture Are Problems Now," says the Richard Ore Co. "We installed 7 Westinghouse Life-Linestarters® in a particularly difficult application, a mine concentrating mill. We were off to a flying start immediately—the Westinghouse Life-Linestarter is easier to install because of straight-through wiring and the arrangement of breaker and starter in a single enclosure. Outages due to moisture and vibration have been virtually eliminated. That had been our biggest headache . . . more Life-Lines will be installed shortly."

"No Motor Failures of Any Kind, Now," says Watchcase Manufacturer. "Our punch-press motors were 14 feet off the floor . . . just high enough so that lubrication was often 'forgotten'. Frequent bearing failures and burnouts resulted until we 'perched' pre-lubricated Life-Lines up there two years ago. Since then . . . no failures of any kind. We've standardized on Life-Lines."

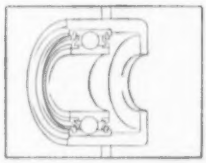
"Straight-Through Wiring Answered My Problem," says the Baker Refrigeration Corp. "We have a new air-conditioning design that requires the use of two starters. We found that the Westinghouse Life-Linestarter could be more easily mounted in a group within our enclosure—saved assembly labor. This completely sold me on your straight-through wiring."

"Increase Bearing Life 8 Times," says Oak Hill Firebrick Co. "We were using sleeve-bearing motors on a shaker screen in a firebrick plant. Bearings never lasted over six months. Life-Lines installed over four years ago have been running 16 hours a day ever since. Pre-lubricated bearings have been perfect."

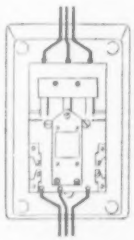
Typical? Yes. Typical of hundreds of reports in every industry. Why not install these dependable partners on your machines? A check with your Westinghouse representative will bring you full details. Ask for copies of "Life-Line Motor Case History Book", B-4769-A and "Tomorrow's Starter Today", B-4677, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21697-A

YOU CAN BE SURE...IF IT'S

Westinghouse



Needs no lubrication. Pre-lubricated, factory-sealed bearings eliminate troubles due to under or overlubrication, dust and dirt.



Straight-through wiring. Three line terminals at top; three load terminals at bottom—all easily reached from front.

Bonderite-protected starter enclosure. Anchors enamel as if it were part of steel itself. Finish will not blister or corrode.

Good Management Pays Off Anywhere

That's right—*anywhere's* the word. And "pays off" means dollars-and-cents benefits *plus something else*—unheard-of gains for workers in their educational, social, and living standards.

But this isn't a sermon. It's a hard-boiled case history of what actually happened when a practical production man put good management to work in two widely separated parts of the world.

By W. C. MATTOX

It's a long way from Lawrenceville in the state of Georgia to Jerusalem in the state of Israel. But the two communities are next-door neighbors in the mind of Claude M. Swinney, an Indiana Hoosier with Irish forebears.

This sounds like an odd combination. But it's not. It's the makings of an exciting and useful story to anyone concerned with production. And it tells better than any lecture what can be accomplished by enlightened production management, whether the locale is Georgia or Israel, or most anywhere else in the world.

First, a word about Swinney. He's a veteran of the U. S. shoe industry. Shortly after World War I, he took his first job in a Massachusetts shoe factory. When he "retired" in 1948 at the age of 55, he was heading production for General Shoe Corporation, where he was a divisional vice president and director.

The Lawrenceville Story

An incident from his career with General Shoe reveals a lot about his manufacturing philosophy. Someday, Swinney once hoped, he'd be in a position to set up an "ideal" production unit—a shoe plant in a small town with no other industry to compete for labor. He thought the best location would be a Southern community, where people lacked opportunity and where a single successful industry would contribute directly and in large measure to community advancement and prosperity.

OPPORTUNITY • Swinney's chance came when General Shoe sought a new factory location. As production manager, he was responsible for picking the site, choosing employees, and training them to operate shoe machinery.

"When we find the right town," he told his fellow directors, "I want to start from scratch. I don't want a single man with shoe-making experience, except some foremen to get us started. I'll select employees solely on the basis of their intelligence and education. I want to pay them what they're worth as individuals and producers. I'm convinced that my plan will result in the most efficient shoe production unit in the company."

And he added: "I warn you that in a few years we'll be paying higher wages in this new plant than in any other. But we'll be producing shoes at the lowest cost in the company."

THE TOWN • Some of the directors were dubious, but Swinney had his way. He chose Lawrenceville, population less than 2000, about 30 miles out of Atlanta, and in the heart of the cotton country.

Lawrenceville had a main street, a bank, a few retail stores, and a high school. Its people were far from prosperous. Once a year farmers borrowed "cotton seed money" from the bank, then paid it back when they sold their crops. There was precious little money left over.

Approaching the town, Swinney passed seedy farm dwellings that spoke eloquently of hardship and poverty. Scarcely more than shacks, they were unpainted, neglected, and usually crowded with growing families. There'd be a mule in the front yard and ancient farm implements in the fields.

Swinney bought an abandoned cotton mill and set a gang of local carpenters and painters to transforming it into a shoe factory. Meanwhile he went around to the Lawrenceville school board. He wanted workers, he told the board, but only high school graduates.

Fine idea, board members agreed. But in Lawrenceville, they said, few pupils finished school. Most of them dropped out to find jobs in the city or help out on the farms. Swinney said there were enough graduates to form a nucleus of factory workers. The best jobs would go to those with the highest scholastic records, he added. They'd be paid while learning their jobs and, having learned, would draw wages based on their individual performances.

By the time machinery was installed in the new factory, foremen from General Shoe's Atlanta plant were teaching eager country boys and girls how to make shoes. Soon the young workers were taking home more folding money than some of their families had ever earned.

RESULTS • As Swinney had predicted, the Lawrenceville plant was soon operating at high efficiency and making shoes at the lowest cost. In two years, it was solidly in the black—a profitable

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GOOD MANAGEMENT ... *Begins on page 234*

unit. In five years, it was employing 450 persons, every worker a high school graduate and every foreman a native of the Lawrenceville area.

Lawrenceville's high school enrollment jumped. Pupils who had dropped out went back to win their diplomas. The school superintendent was the happiest man in town as attendance broke records and scholarship reached new highs. Lawrenceville youth was intent on acquiring diplomas and jobs in the shoe factory.

The town itself prospered. Bank deposits soared. Business boomed in retail stores. On Saturday nights the farmers' parked cars lined the courthouse square. Out in the country, farms took on a new look. Farmers painted their homes, added rooms, bought refrigerators and washing machines. Hardly a family in the Lawrenceville area was without one member bringing home cash each week. Weekly wages averaged $40—and that was long before pay levels started spiraling upward.

PARTIAL PROOF ONLY • Lawrenceville, Swinney felt, had proved his theory that people who'd had no opportunities could be taught to work efficiently in a mass-production plant. But he also felt the test wasn't convincing because he'd selected only high school graduates.

Would his experiment succeed, he wondered, if he hired uneducated, destitute people? Was it possible to teach frightened, ill-nourished workers in backward countries to make shoes in a modern factory? How would they respond to the American scheme of fixed working hours, shop discipline, and production-line efficiency? Would they accept and understand humane treatment and management's sincere, friendly interest in their progress?

Swinney had a hunch that, given a chance, he'd get positive answers to those questions. He found his hunch was right when, several years later, he set up and operated Israel's first mass-production factory. And he found, too, that the problems posed in Lawrenceville and Jerusalem were fundamentally alike.

The Jerusalem story

Swinney was in retirement when two men put the Jerusalem project up to Maxey Jarman, president of General Shoe. The two were Joseph Sugarman, a Boston lawyer and active Zionist who had represented the shoe industry in labor negotiations, and Nahman Habas, a native of Israel and an importer of leather and shoe findings at Tel Aviv.

Sugarman and Habas were convinced that Israel would survive only if it became an industrial nation, exporting manufactured goods to build a lasting financial structure. They decided to start with a shoe factory.

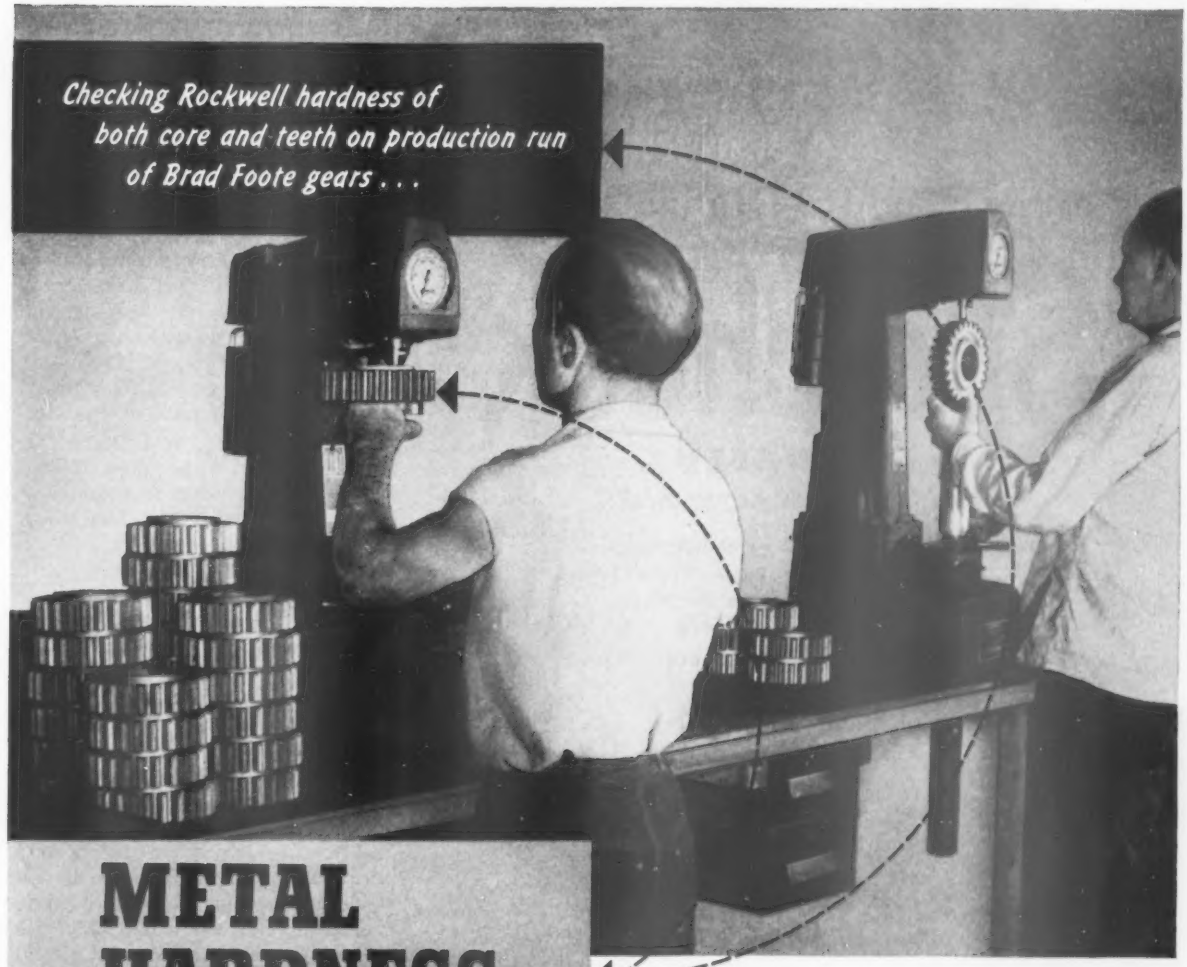
OVER-ALL PROBLEM • Both men knew they needed not only a plant and equipment but also management capable of setting up a system patterned on American mass production. They suggested to Jarman that General Shoe furnish the brains and experience in exchange for partnership in the enterprise. Jarman liked the project, provided Swinney would handle it. Swinney heard the details from Jarman.

"We're to design the factory building to be erected in Jerusalem by Sugarman and Habas," Jarman said. "Meanwhile we're to purchase all machinery and supplies and ship everything to Jerusalem. Then you'll go to Jerusalem with a group of selected instructors.

"You'll pick and train your employees from among the immigrants in Israel. Within a year after production starts, you'll be free to return home and the people over there will take over. It's quite a project."

It *was* quite a project, Swinney agreed—and accepted the job.

Turn the page



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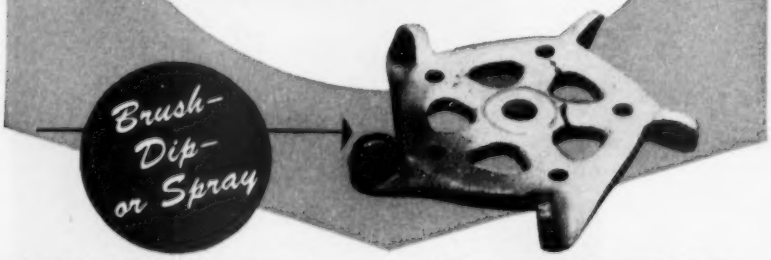

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Pint Cans	——	——	$4.00 ea.	(12 cans) $2.25 per can	$4.00 ea.	(12 cans) $2.00 per can
Quart Cans	——	——	$6.00 ea.	(5 cans) $4.00 per can	$5.00 ea.	(5 cans) $3.00 per can
1-Gallon Cans	$3.00 ea.	(10 gallons) $2.50 per gal.	$15.00 ea.	(10 gallons) $14.00 per gal.	$9.00 ea.	(10 gallons) $8.50 per gal.
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GOOD MANAGEMENT

Begins on page 234

PLANT • His first task was to design a factory building. Right off the bat, he faced a unique problem. Winds blowing into Jerusalem off the Arabian desert carry sand particles that would play hob with machinery bearings and ruin leathers in process. So the factory had to be sandproof. Modern air conditioning with filtering was the answer.

MACHINERY • Far more difficult was the problem of buying machinery and shipping it to Israel. Modern shoe machinery is, with few exceptions, not for sale in the U. S. The leasing system, under which manufacturers pay royalties to use machines, is almost universal. Machinery manufacturers lease out equipment only in areas where they maintain service crews. There are no service men in Jerusalem.

Swinney went on a buying trip that took him first to Canada, then to shoe machinery centers in Boston and New York, and finally through England, Sweden, France, Germany, and Italy. He had to adapt diverse electrical systems of shoe machines made in seven different countries to operate with the electrical current available in Jerusalem.

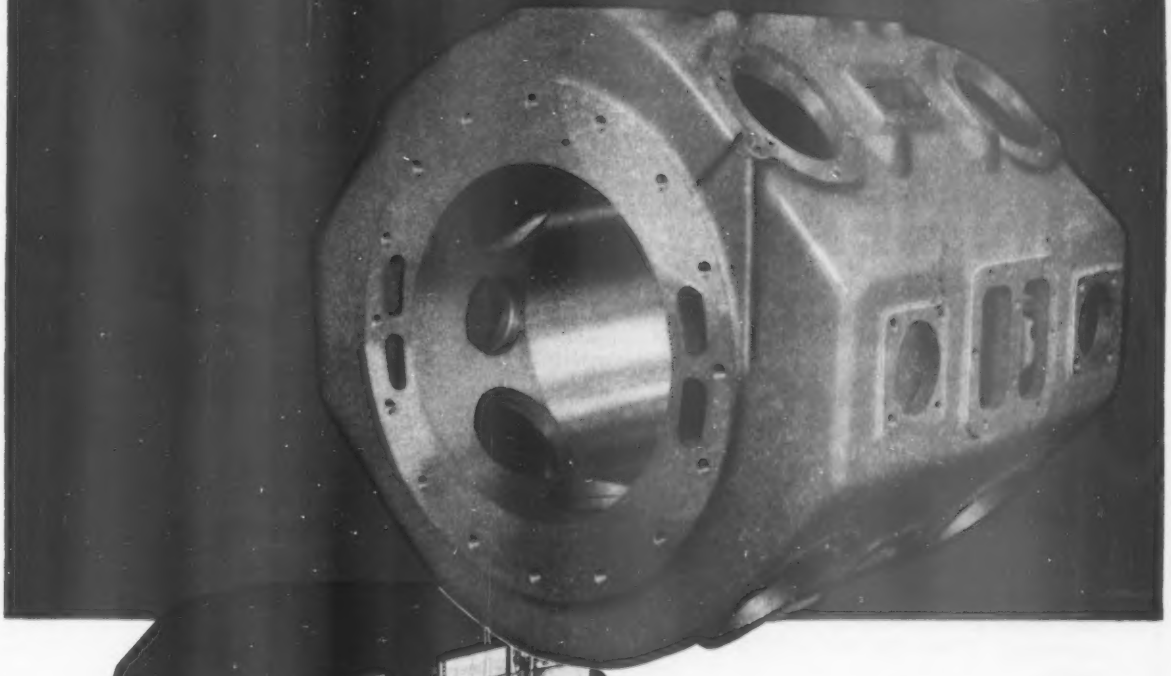
In addition to equipment, thousands upon thousands of items of supply were needed. They ranged from wooden pegs to cement, from eyelets to waxes, dyes, and threads. Few would be obtainable in Israel.

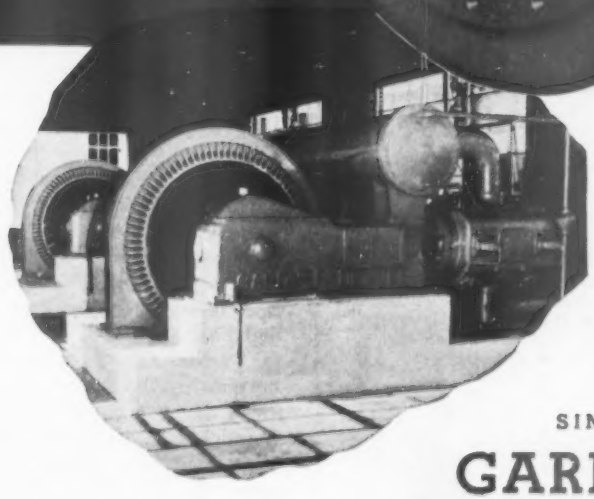
"I checked and rechecked the list until I could almost recite the items from memory," Swinney recalls. "Somehow we managed to get everything to Jerusalem in time."

Swinney reached Jerusalem in February 1950 to find the new plant well under way—a modern, air conditioned, 1-story building with a 2-story administration wing, cafeteria, and showers for workers.

INSTRUCTORS • With Swinney

the hole story of HA efficiency





EACH opening in the HA air cylinder has been plotted to fill your lines with extra cubic feet of air for every power dollar. Some holes take the free-flowing compressor valves. Some admit water to the effective cooling jacket. Other openings hold regulators that keep the HA in step with your air demands. Get the whole story today. Send for Bulletin HAC-36.

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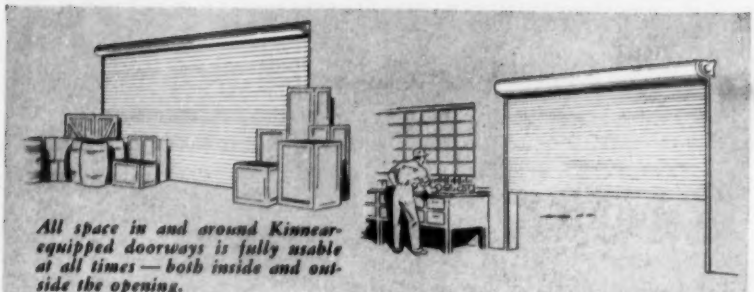

All space in and around Kinnear-equipped doorways is fully usable at all times — both inside and outside the opening.

These are just a few of the reasons why you get maximum door efficiency, space economy and protection when you install

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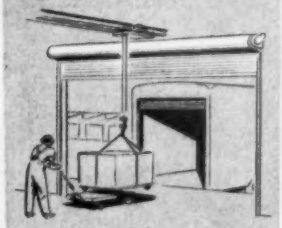
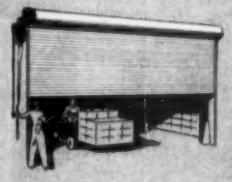
Work space and window areas can continue right up to the jambs of Kinnear Rolling Doors.

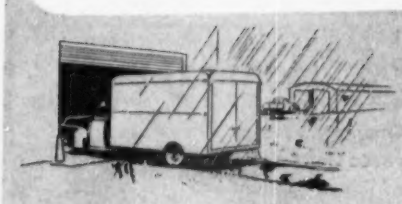


Ceiling space remains clear, for maximum use of cranes, conveyors, or hoists in and around door areas. Kinnear Doors can also be arranged to accommodate crane tracks extending through opening.

No other type of service door combines such high efficiency with the effective protection of Kinnear Rolling Doors.



Kinnear Motor Operated Doors open, close, or stop at the touch of a button, or by means of other types of manual or automatic control devices.



Wind is never a hazard to Kinnear Rolling Doors. The rugged steel slats are anchored in steel jamb grooves from floor to lintel.

The vertical action of Kinnear Rolling Doors is not blocked by snow, ice, gravel, or uneven ground.

GOOD MANAGEMENT

Begins on page 234

were seven skilled American instructors, each an experienced foreman and a specialist in some phase of shoe manufacturing. All seven had received special training to prepare them for their unaccustomed duties in Israel. Four of them had spent two months in England learning to operate British-made shoe machinery. It was a seasoned crew. Experience of the seven instructors and Swinney added up to 146 years, an average of 18 years per man.

TOUGH OUTLOOK • Prospects were not encouraging as the eight Americans started setting up machinery and recruiting workers. Sporadic fighting was still going on between Jews and Arabs. Torn by the conflicting ideologies of many political parties, the Israeli government was floundering in bureaucracy. Thousands of DP's were existing in cramped quarters in the immigrant camps.

MANPOWER • This time it was from no English-speaking high school graduates that Swinney hoped to recruit his shoemakers. They had to come from immigrant camps, from among homeless men and women speaking a babel of languages. None had ever worked with modern machinery or had any knowledge of shoe manufacturing. Few had ever been employed at regular wages.

There were farmers, laborers, tradesmen, ex-soldiers, wanderers, adventurers, and political fugitives from all the countries of Europe and the Near East. Many had been on their way to Israel for years. They arrived with nothing but the clothes they wore. Some came from Hitler's horror. There were the sick, the lame, the blind, and the insane — people some countries were glad to send to Israel lest they become public charges.

There were orthodox Jews, reform Jews, and anti-religion Jews—each group openly hostile to the others. There were adherents of Israel's 20 political

coming to you in May FACTORY "BETTER PLANTS — for today's ... and tomorrow's ... needs"

A complete, separate section that will:

- help you plan or build a better new plant
- more effectively modernize your present plant
- demonstrate the opportunities for more efficient operation through better plants
- show you how to get the most efficient plant for the money you are spending

COMPLETE...IN MAY FACTORY

Why the MAY "BETTER PLANTS" issue is being published . . .

1. Industry is building – and planning – better plants at a rate that continues high. And predictions are that this rate will continue.

2. More than ever, plants are being built to achieve more efficient operation. New plants are built to the operating specifications of Plant Operating Men . . . the men who read FACTORY. You will read the latest plant building practices in the May "Better Plants" section.

3. You . . . as a member of the Plant Operating Group . . . must be able to demonstrate why you need to spend money for the most efficient plant and equipment. FACTORY will give you the facts you need.

4. Industry has reached a turning point in respect to the reasons for building new plants or modernizing old ones. It's not alone a question of more capacity – fast. Now it's also a question of better plants for more efficiency. FACTORY will help you demonstrate how better plants reduce costs.

What the MAY "BETTER PLANTS" issue will contain . . .

May 1953 will come to you in two separately-bound sections:

Part I will include FACTORY's regular editorial content on Plant Operating subjects.

Part II will be *wholly devoted* to editorial and advertising on the subject "Better Plants — For Today's . . . and Tomorrow's . . . Needs."

For maximum service, the "Better Plants" section will be separated into four sections; each complete in editorial and advertising:

1 – Buildings and Grounds
2 – Plant Services
3 – Electrical Distribution
4 – Materials Handling

What the four sections will include:

BUILDINGS and GROUNDS Section: to report on the trends in building design and construction that will help you build a better new plant or modernize your old one; case examples from significant new plants; new twists in buildings and grounds.

This section will show you how better plants:

- offer economies of operation and easier maintenance
- permit easier expansion
- permit use of heavier floor loads and more mechanized handling equipment
- improve industrial relations
- provide flexibility that permits quicker adaptation to different plant layouts
- permit use of new equipment as it comes into use
- reduce labor turnover

PLANT SERVICES Section: to show you why plant services should be considered when the new plant is being planned; to demonstrate that plant services that are "built-in" to the plant improve operation.

This section will illustrate how better plant services:

- improve distribution of air, water, gas, etc. and why such improvements result in better plant operation and lower cost
- incorporate new developments and methods such as latest models of air handling and dust control equipment
- provide the employee facilities that high-grade work demands
- pay off in easier procurement of workers, in lower turnover, in better morale, in higher productivity

ELECTRICAL DISTRIBUTION Section: to report to you on new trends in electrical distribution and tell why they are important; to give you what you need to know to justify purchase of new electrical equipment.

This section will demonstrate to you:

- the important changes in recent years in requirements put on power distribution
- how "fringe area" location of plants has meant that plants have to provide electrical facilities formerly furnished by utilities
- the need for buying the best equipment – and the advantages in doing so
- the trend toward flexibility in power systems – and what equipment is now available
- how to sell the advantages of more complex electrical equipment

MATERIALS HANDLING Section: to tell you why more new plants than ever before are being built to achieve opportunities for improved materials handling; to illustrate why many plants are not getting full advantage of present-day materials handling methods and equipment because their plant was not built with those advantages in mind.

This section will demonstrate:

- the advantages of planning improved materials handling *when the plant is being built or modernized*
- that one of the best reasons for building a new plant or modernizing an old one is to take advantage of savings possible in new materials handling setups
- the importance of planning far enough ahead to insure that the plant is adaptable to advances in materials handling
- the advantages--and disadvantages--from a handling point of view, of multi- and single-story plants
- how mechanized handling can improve in-process inventory
- economical use of yard space and yard handling
- advances in packaging and shipping methods

"The issue you've described will certainly be a handbook for plant men."

That's what one important Plant Operating Man said when he heard about FACTORY's May "Better Plants" Section.

EXTRA COPIES AVAILABLE

Many Plant Operating Men have indicated that they will want extra copies of this issue, so that they may supply individual copies to each member of their staff. FACTORY is prepared to supply these issues at cost.

If you need extra copies of FACTORY's May "Better Plants" issue, write FACTORY's editor now and reserve your copies.

SUGGESTIONS WELCOME

If you have a particular problem you would like to see treated in the "Better Plants" section, write FACTORY's editor and tell him about it.

And FACTORY welcomes comments on the issue and the objectives . . . give us yours.

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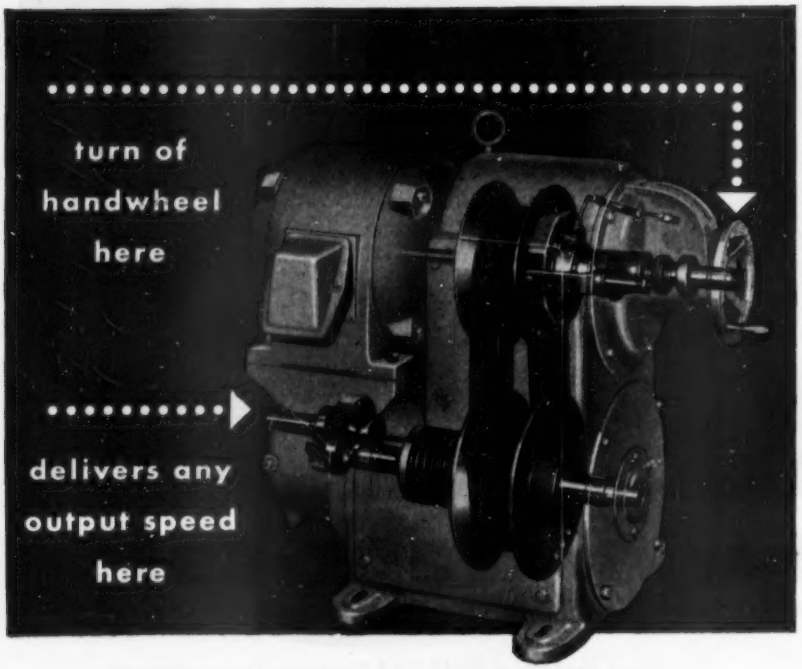

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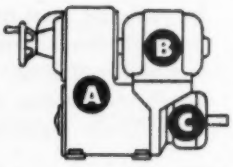

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Recognized leader in the specialized field of variable speed control

REEVES Variable Speed Drives
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GOOD MANAGEMENT

Begins on page 234

parties. Communism was preaching a doctrine of resistance. And a bureaucratic government seemed bent on thinking up new, hampering regulations.

Men who claimed to know told Swinney that the so-called "Orientals"—the name given to refugee Jews from North Africa —were not "teachable." They said it was impossible to instruct these people in even the rudiments of production routine, preposterous optimism to expect them to run machines.

Here in the heterogeneous, discouraged populace of the immigrant camps was a challenge to sober any enthusiastic idealist The best that Swinney could hope for was a nucleus of men and women with nothing in common but the desire for freedom and safety and a burning ambition to make a success of the Israeli experiment.

LANGUAGE • The applicants spoke a score of tongues, but Swinney was determined to question each one. He used a screening technique developed in America and the actual employment blank he had worked out years before for General Shoe. The same questions were asked, in the same order. Two men from the camps, who spoke the languages needed for interviewing, asked the questions. Swinney couldn't understand the answers—they were translated and entered later on the blanks. But he knew the questions being asked and could judge whether a candidate reacted quickly and appeared "teachable."

One by one, he selected the men he considered "most likely to succeed." Pending completion of the factory, he sent them to a preliminary training school, set up in an abandoned printing plant. His selection method proved to be sound. Of the first 38 workers he hired, 35 were still with him a year later.

TRAINING • It was in the training school that Swinney and his in-

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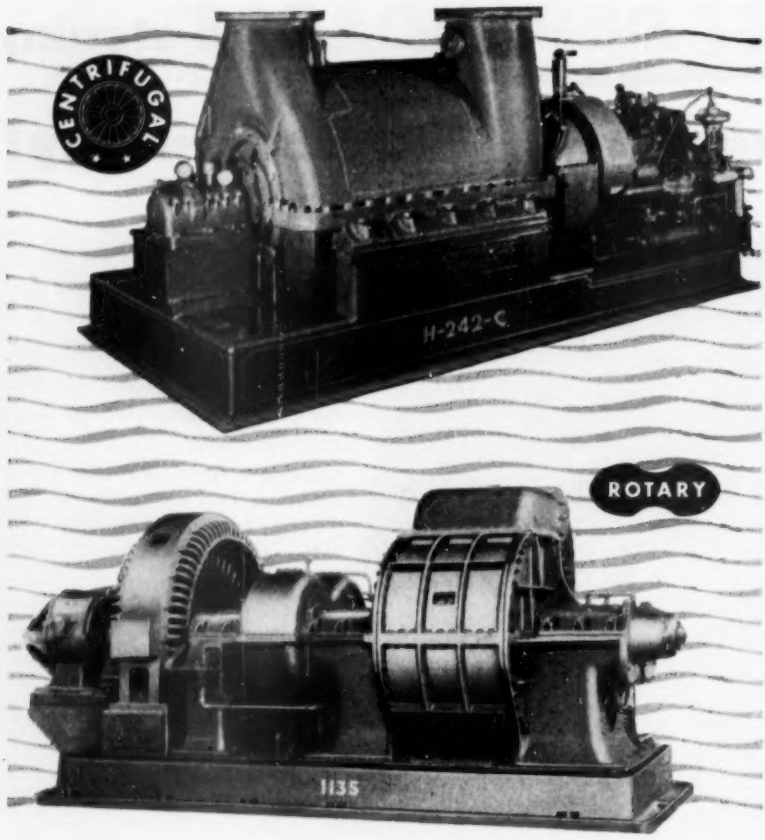

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GOOD MANAGEMENT

Begins on page 234

structors solved their most pressing problem—how to overcome the language barrier in teaching the 250 operations involved in shoemaking. The answer was visual training.

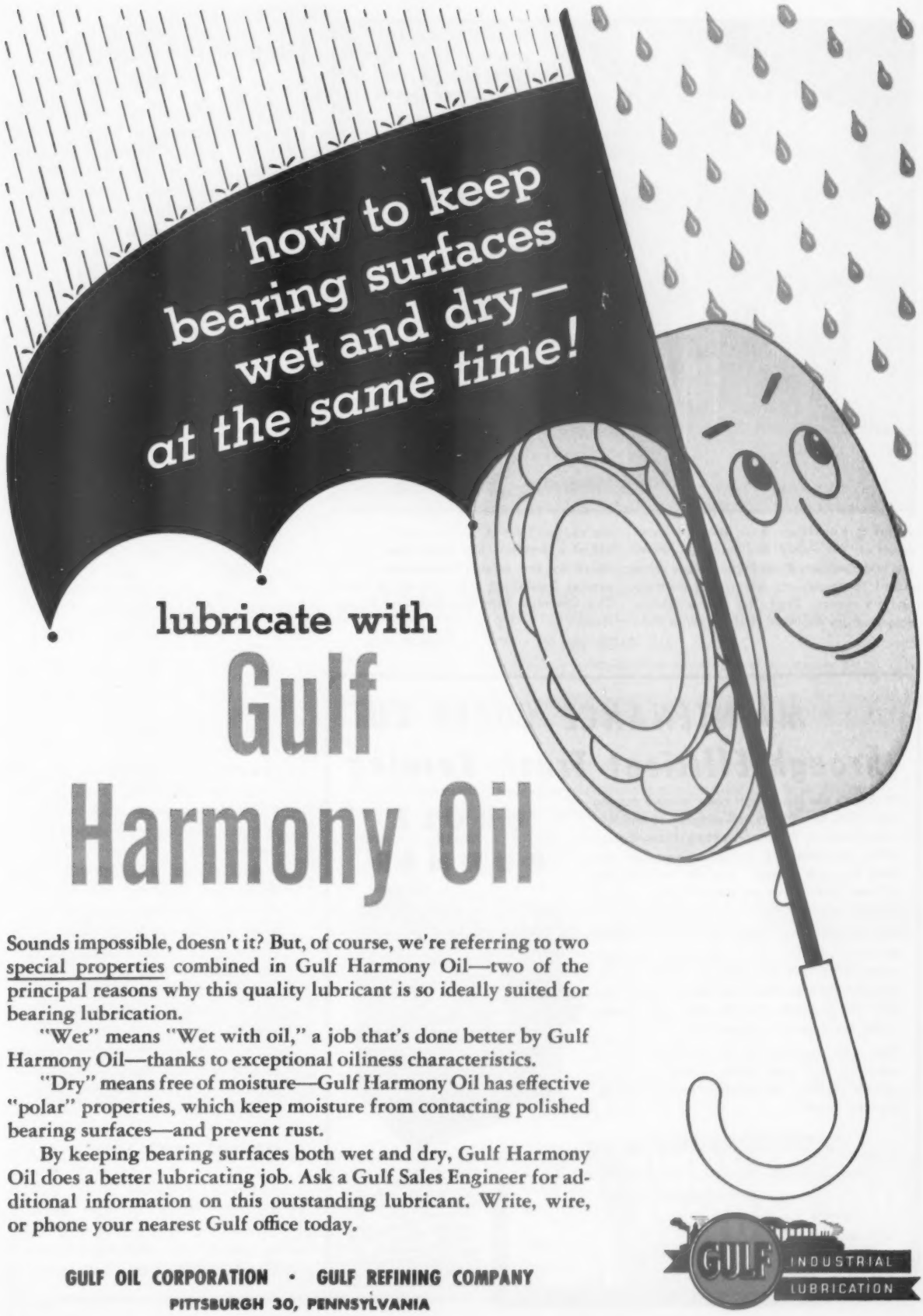
"We couldn't *tell* these people anything," Swinney explains. "So we had to show them. Anybody can see where a man places his hands, how he uses his fingers, how he starts a machine by pressing a pedal with his foot. After demonstrating each operation, we guided the trainees' hands and watched them long enough to see they were doing the work right."

To their astonishment, the t e a c h e r s found their pupils learned as fast as American beginners. Moreover, there was less misunderstanding. The eager men and women concentrated all their intelligence on the task of learning.

"We had a progress chart on each job," says Swinney. "It was based on our American experience and showed how efficient an operator should be at the end of 1 month, 3 months, 6 months, and so on. In some cases, our Israeli workers were far ahead of scheduled progress. We also kept daily and weekly records on each worker's efficiency, using the same time elements we had used back home. And we found that our workers, taught by the visual system, rated well in efficiency compared with Americans."

In the training school production started on sandals. A skeleton crew of 40 trainees was soon producing 300 pairs of sandals a day. In mid-July 1950, Swinney closed the school and began work in the new factory.

Now came the real test of his planning. The factory was to make Goodyear welt shoes—a much more difficult process than making sandals. Would visual training work in the factory? Would people with no background in organized industry adjust themselves to the strange environment, unfamiliar disci-



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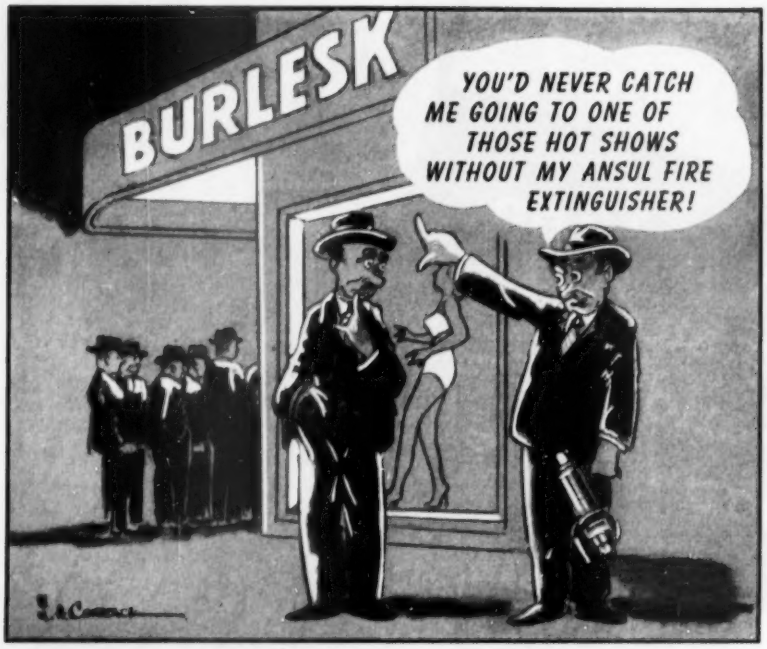

Ansul Extinguishers have put out thousands of "hot shows" in flammable liquid, gas and electrical fires. Fire-fighters using Ansul Extinguishers are cool customers on two counts. First, the heat shielding screen of dry chemical protects them from the radiant heat of the fire. And, second, actual experience has given them confidence in the safety, dependability and greater fire-killing effectiveness of Ansul Dry Chemical Fire Extinguishing Equipment.

SEE PAGE 288

• • • • MAINTENANCE COSTS CUT through Efficient Trash Burning

• Among the results that come in trash burning with Brulé Incinerators are—simplifying and lowering costs of handling—cutting time—making space available for production purposes now used for trash storage. You can burn 500 lbs. of usual plant wastes per hour with same reduced to but one pound of ash.

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Each firebrick in the arches is hung on cast iron hangers and sidewall courses also include supports. This arrangement frees the brickwork from mechanical stress. Each piece thus adjusts itself under temperature changes.

GOOD MANAGEMENT

Begins on page 234

pline, regulated hours, and day-long concentration on repetitive tasks? Could Swinney and his small group of Americans reach their goal—10,000 pairs of shoes a month within a year after the factory's opening?

PROBLEMS • The project was plagued by absenteeism. Some workers hadn't regained their health after long years of destitute living. Others were called into the army. The American supervisors often had to work full shift at machines to keep the assembly line moving.

Many employees had difficulty grasping the assembly line idea.

"Why can't I do both seams on the upper?" asked a blonde girl from Rumania. "Why must I hand it in after making a few stitches?" Time and again, the Americans explained through interpreters why assembly-line operations were more productive.

The American bosses drove their workers hard. But if they were tough, it was because there was much to be done in a short time.

PAY-OFF • The first Goodyear welt shoes were packed in early August, and in September women's sliplasted shoes were added to the factory line.

By October, *three months after operations started,* monthly production had reached 10,344 pairs of shoes—344 more than the 12th month goal. It hit 19,913 in January 1951, 1000 per day in March.

By February 1951 there were 221 workers, speaking 16 different languages, on the payroll. As the employees acquired "basic Hebrew," something of the social atmosphere of an American factory began to premeate the plant.

PERSONAL TOUCH • Swinney maintained close personal supervision of personnel. Every morning he stood at the factory entrance greeting each employee by name. He remembered to ask Yosef from Bulgaria how the new

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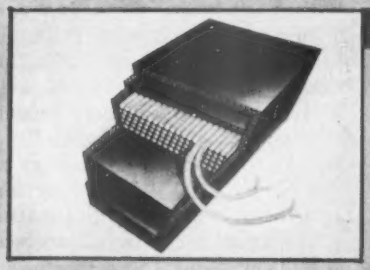
Durkee-Atwood's new vertical V-belt matching machines eliminate the "sag" error always present when V-belts are matched on horizontal matching equipment. Calibration of true running length assures equal power transmission from all belts on multiple belt drives. The machines also test for vibration and possible internal imperfections.



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High-tenacity Cordura® rayon cords give Durkee-Atwood Industrial V-Belts longer life, less stretch, and greater shock resistance. Use of this revolutionary new cord material is another one of the reasons why D-A Industrial V-Belts are guaranteed to satisfy on any drive.

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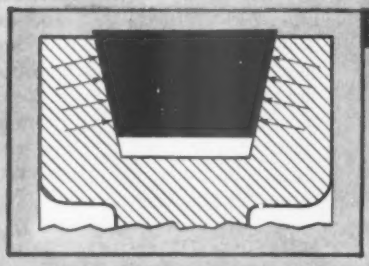

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Durkee-Atwood V-Belts are manufactured with straight sidewalls to maintain full groove contact at all times giving positive drive action. Straight sidewalls reduce slippage and assure smooth, efficient power transmission. The load is distributed evenly over the entire thickness of the belt giving it longer life.

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Every set of Durkee-Atwood Multiple V-Belts is balanced isodynamically. By running matched sets under full load on special testing equipment, Durkee-Atwood engineers verify their exact equality of load distribution and tension. When you buy Durkee-Atwood Multiple V-Belts you can count on maximum power transmission efficiency . . . pretested to guarantee high-production performance and longer belt life.

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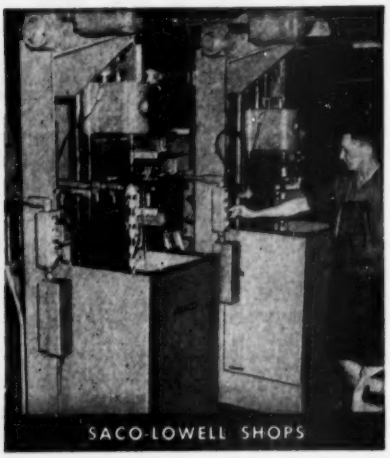

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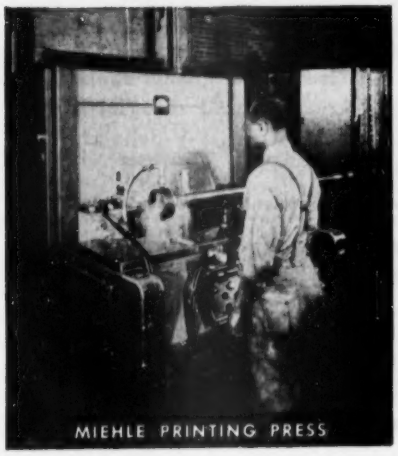

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YOU CAN BE SURE...IF IT'S Westinghouse

J-02255

Begins on page 234

baby was faring, to joke with the girl from Iraq about her boyfriend.

"The burden of fear and the feeling that came from being scorned throughout their lives showed in their faces when they first started work," says Swinney. "They came with heads bent, shoulders drooping, feet shuffling in a way to suggest prison habits and life-long despair.

"There was one Czechoslovakian fellow who wept openly. He still mourned the deaths of his wife and five children in a prison camp. 'Shalom (peace), Simon,' I would call out. His face would light up. 'Ken, Ken (yes, yes),' he'd reply, and with head high and straightened shoulders, he'd walk into the factory. It was a stimulating experience, repeated many times each morning."

To the workers, the factory was a phenomenal place. They marveled at its complicated machinery, spotless cafeteria, fluorescent lighting, and clean washrooms and showers with hot and cold water. But, above all, they marveled at their own accomplishments. A stitcher from Yemen scanned the big factory room and remarked: "I never *wore* shoes before I came to this country. Now I *make* shoes."

WHAT DOES IT PROVE? Swinney thinks his Jerusalem experience proves that American manufacturers can bring higher living standards and new hope to people in backward countries—with profit to themselves.

"Few people could be less equipped to work in a mass-production industry than the group we selected in Israel," Swinney says. "Most of them had been homeless wanderers for years. All had lived, if not in fear and danger, at least under the disheartening stigma of being Jews.

"In a few months, we saw a startling change in their attitudes and actual living conditions.

Turn the page

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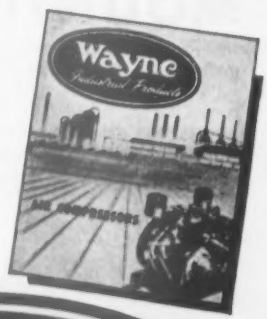

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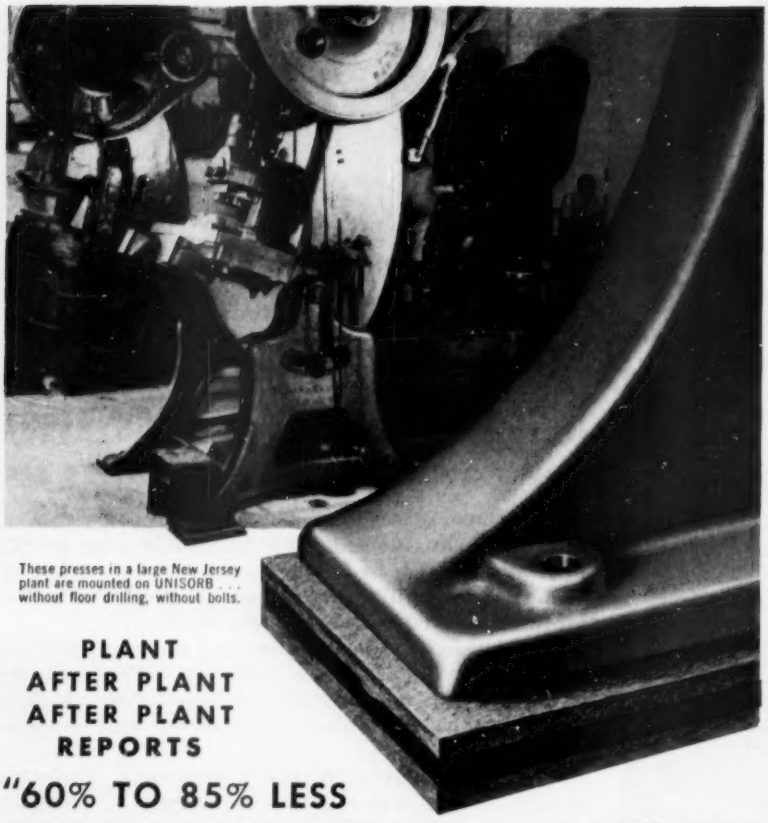

These presses in a large New Jersey plant are mounted on UNISORB . . . without floor drilling, without bolts.

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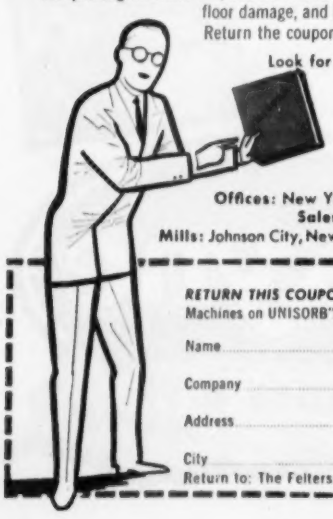
Now you have a machine mounting method that is ideal because every UNISORB mounting pad is made specially for the machine you're going to mount.

UNISORB is provided in the proper thickness and density for your specific job. It is used with cement that sets overnight. Or, for machines that do not require shimming, UNISORB is available precoated with adhesive.

You prolong machine life, reduce transmitted vibration and noise 60% to 85%. You eliminate floor damage, and it's easy to reposition machines mounted on UNISORB. Return the coupon today for your copy of the UNISORB book.



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The **FELTERS** Company

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RETURN THIS COUPON NOW! for your copy of "Why It Pays to Mount Your Machines on UNISORB". No obligation.

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GOOD MANAGEMENT

Begins on page 234

They were proud of their jobs. They were enjoying a prosperity far beyond any dreams they had ever cherished. They were establishing their own homes, sending their children to good schools, thinking and acting as free men and women. I believe that only an industrial enterprise like ours —patterned after American mass production—could have wrought such a change in so short a time.

"Our visual training technique exploded a widely held theory that people of the Middle and Near East are generally unteachable in the American industrial sense. Of course, America has absorbed untrained European peasants into a machine economy. But in America we have trained mechanics working alongside beginners and guiding them. In Israel we worked with the raw human material among surroundings with no established manufacturing system.

"Visual training offers many advantages over verbal and text book teaching. People learn faster and better by watching and doing than by hearing or reading instructions. Further, visual training teaches the right way only, and the pupil knows no other way. As a result, our production line was seldom snarled by operators trying the innovations so dear to smart American workers."

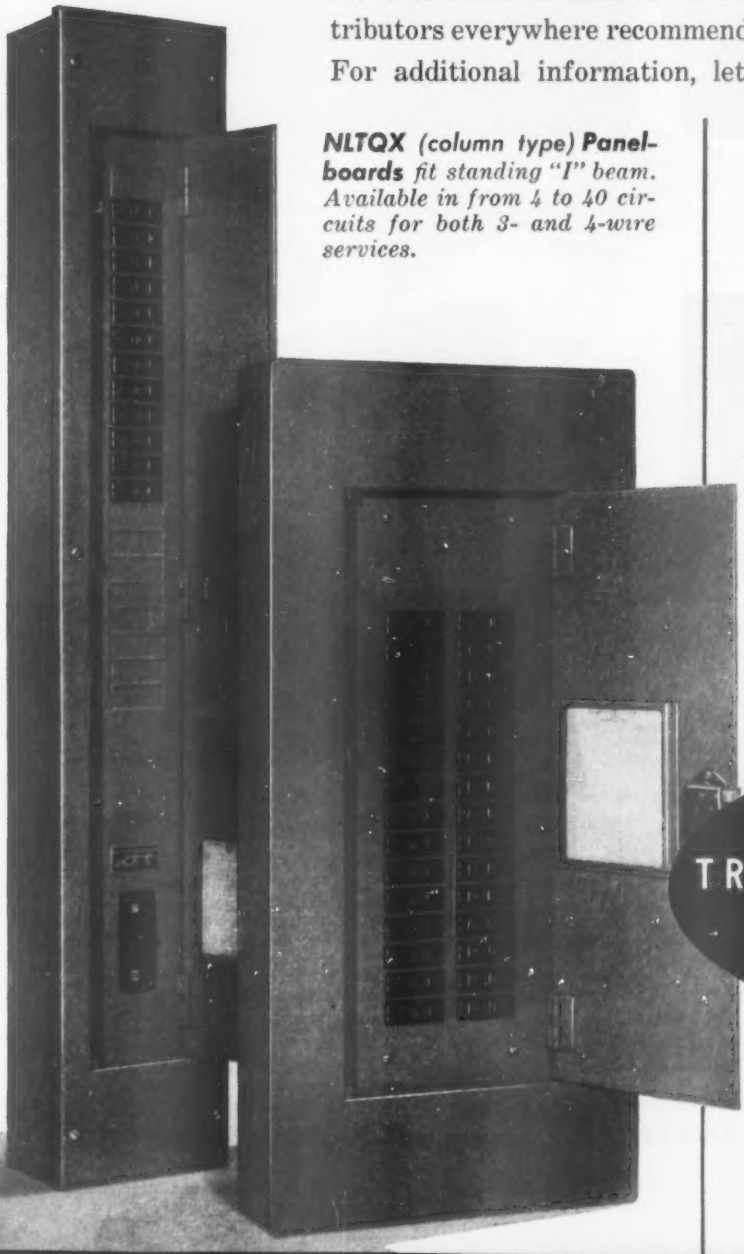
The Israel factory was small compared with a large American shoe plant. "But," says Swinney, "I found the people responded like American workers to good treatment by their bosses. Basic personnel principles—recognizing workers as equals engaged in a mutual effort, recognizing them as individuals rathers than cogs in a machine, sincere praise for good work, and timely help and advice when needed—were very successful in Israel.

"At the risk of triteness, I say people are much alike everywhere in their response to fair and honest treatment—even in such contrasting places as Jerusalem and Lawrenceville, Ga."

PICK TRUMBULL NLTQ LIGHTING PANELBOARDS

..for more Convenience in less space with maximum protection and flexibility for future needs

Trumbull's fifty-year leadership in panelboards has never been more in evidence than in its NLTQ line. Leading electrical distributors everywhere recommend them and carry complete stocks. For additional information, let us mail you Bulletin TEB-14.



***NLTQX** (column type) **Panelboards** fit standing "I" beam. Available in from 4 to 40 circuits for both 3- and 4-wire services.*

3 WAYS BETTER...

1. Circuit breaker convenience and protection. Type TQL. Quick-make, quick-break. Thermal-magnetic trip, arc-quenching design and trip-free action for top protection. Convenient plug-in design and manual re-set. Equally important, it has a separate trip indicating position.

2. Strong compact interiors readily removable for fast installation. Busbars molded in plastisol, and braced against damage from current surges. Run cooler than in open air.

3. Compact boxes, protected fronts. Adequate knockouts and gutters. Front integral with barrier. Breaker knockouts in front panel to provide for future circuits.

TRUMBULL (T) ELECTRIC

DEPARTMENT OF GENERAL ELECTRIC COMPANY
PLAINVILLE, CONN.

***NLTQ Panelboards** available in from 4 to 42 circuits for both 3-wire and 4-wire services with lugs only or Trumbull 50 to 225 ampere breakers in the mains, and TQL 120 volt, 10 to 50 ampere circuit breakers on branches. AC only. Underwriters' Laboratories, Inc. listed.*

How would YOU control costs here?

1. SOFTBALL MANUFACTURING COSTS are dependent on obtaining absolute product uniformity. Most difficult and important part to control is the kapok core. H. Harwood & Sons, Inc., of Natick, Mass. solved this problem by welding the cores under hydraulic pressure at closely controlled high temperature. Two inexpensive THERMOSWITCH units per mold provide the needed temperature control at low cost.

2. SAVED $17,975 S-T-R-E-T-C-H. Pre-stretching under high heat is the only way of making Nylon fish line that won't stretch and shrink. One manufacturer was quoted $18,000 for complicated control equipment. Instead — and very successfully — he stretches the line in a heated die, temperature-controlled by a Fenwal THERMOSWITCH. Cost, less than $25!

3. THIS IS IT — the Fenwal THERMOSWITCH control is simple — compact shell contracts or expands *instantly* with temperature changes, opening or closing electrical contacts. Adjustable and highly resistant to shock and vibration. Fenwal THERMOSWITCH units are helping cut costs and improving production throughout all industry.

4. SEND FOR THIS NEW CATALOG for complete explanation of the unique THERMOSWITCH unit. Also ask for more detailed, illustrated discussions of the problems above. Fenwal engineers will be glad to help you solve your temperature control problems involving heat, humidity, radiant heat, pressure and other variables. Write **Fenwal Incorporated, 62 Pleasant Street, Ashland, Massachusetts.**

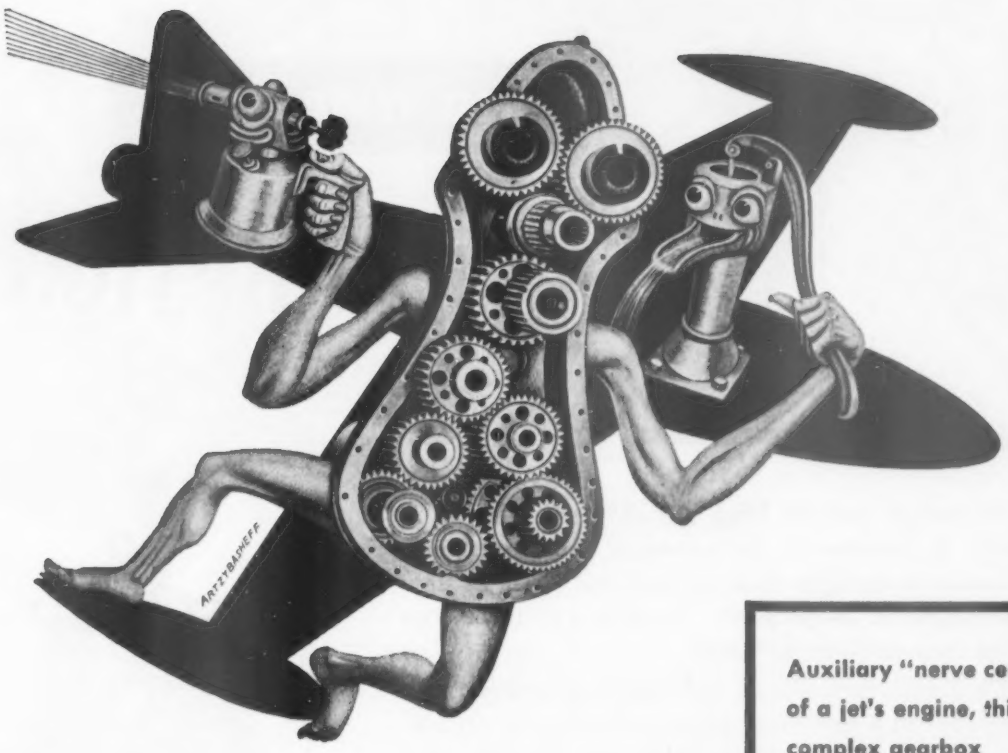
Fenwal

THERMOSWITCH®

Electric Temperature Control and Detection Devices

SENSITIVE . . . *but only to heat*

How a jet engine runs on its "nerves"



Auxiliary "nerve center" of a jet's engine, this complex gearbox transmits the power that runs oil and fuel pumps, generators, and other vital accessories. To produce this intricate unit for J-40 engines, Westinghouse looks to Lycoming for precision production.

From a jet's mighty engine, these precision gears "take off" power and pass it along to vital accessory equipment *at the specific rate required by each different* unit. As many as 30 separate gears . . . as many as 2500 separate machining and assembly operations . . . go into this gearbox so essential to safe, efficient operation of a jet. And for this tremendously complex production, Westinghouse depends on Lycoming.

Lycoming stands ready to assist *you*, too. Whether you have "just an idea" that needs development, a problem in the blueprint stage, or a finished metal product that needs precise, speedy fabrication . . . you can depend on Lycoming's long-tested ability to meet the most exacting and diverse industrial or military requirements. *Whatever* your problem—look to Lycoming!

Lycoming's 2½ million feet of floor space, its more than 6,000 machine tools, and its wealth of creative engineering ability stand ready to serve your needs.

AIR-COOLED ENGINES FOR AIRCRAFT AND INDUSTRIAL USES • PRECISION-AND-VOLUME MACHINE PARTS • GRAY-IRON CASTINGS • STEEL-PLATE FABRICATION

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Please send me further information on Lycoming's varied abilities and facilities.

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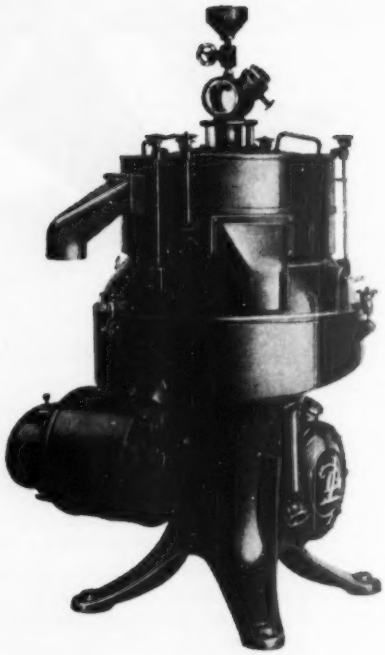
NO TIME FOR INTERRUPTION!

It always pays to keep the objective clearly in view! In processing, for example, the objective is to achieve straight-line production, with as few interruptions as possible. Centrifugal force can often help achieve this goal.

De Laval centrifuges can speed up many processes, for in a matter of minutes they make separations that with gravity or inefficient filtering once took hours. Such continuous centrifuging takes three basic forms:

1. The continuous separation of two liquids
2. The continuous clarification of one or two liquids
3. The continuous separation of two liquids plus the continuous removal of solids from one or both liquids

Each problem is different, but with a background of some 75 years of experience with centrifugal machines, De Laval engineers may well have solved a problem like yours. Why not ask?



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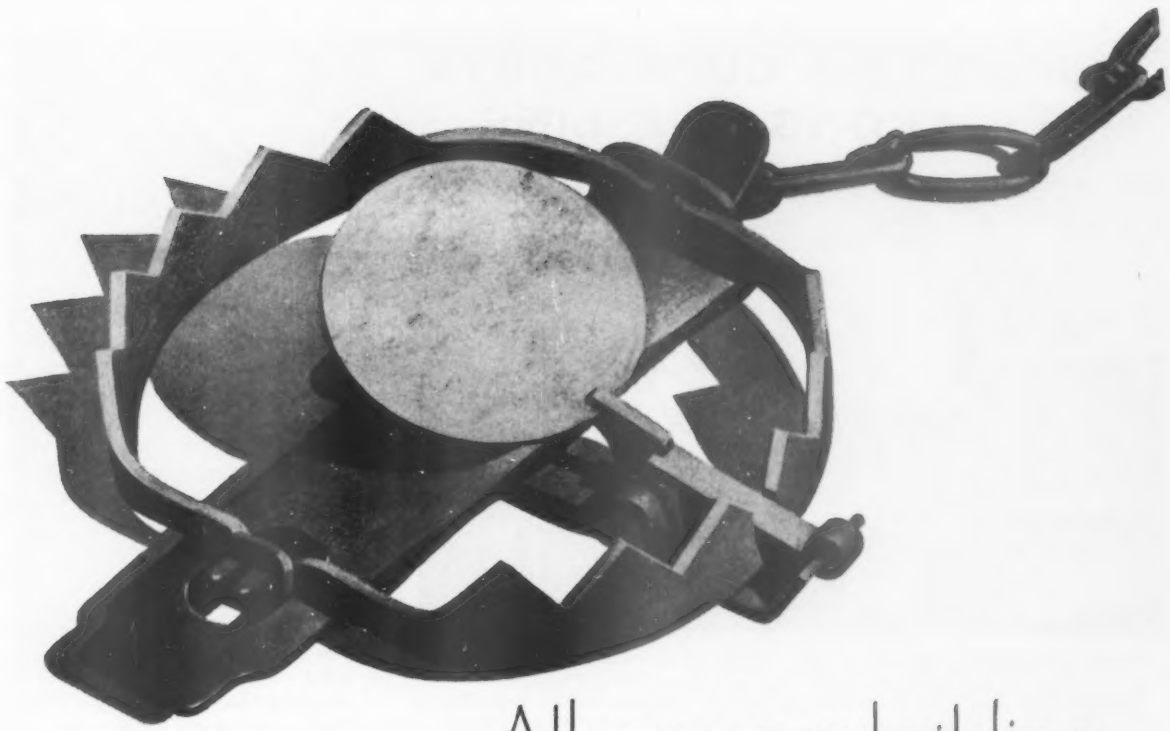

All over your building, fire sets its traps. In dip tanks, transformer vaults, storage spaces. In fact, wherever it can stop your business in its tracks. Make sure you don't fall victim. Post a KIDDE Portable Extinguisher next to every fire hazard.

Kidde

Walter Kidde & Company, Inc.,

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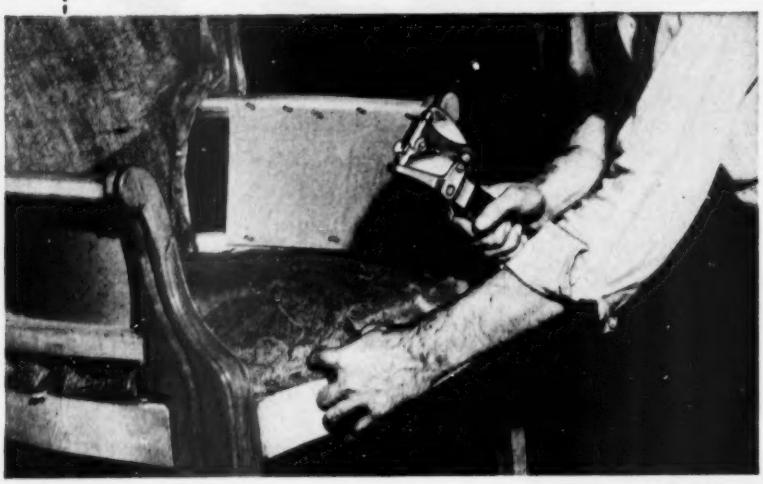
BOSTITCH CUTS COSTS ALL ALONG THE LINE



"Knocks ⅔ off our cost," reports a North Carolina furniture manufacturer. He's talking about the Bostitch H2B Hammer. On this upholstery job, it does the work of hammer and tacks at *about ⅓ the cost*. That's because the one-hand, one-blow, stapling operation is so much faster. The upholsterers like it, too — no more mashed fingers, no sore tack-filled mouths. Manufacturers and contractors in other fields report equally impressive savings when they switch from old fastening methods to Bostitch.

From $9 to $2 a thousand! The same furniture manufacturer was using tags with pins attached for labelling upholstery samples. Now, tags *without pins* are fastened with a Bostitch hand stapler. The savings are substantial — $7 a thousand on tags alone. *The job gets done 50% faster.* And the girls doing the tagging are a lot happier.

Three times faster than tape and glue! In the shipping room, too, Bostitch cuts costs for the furniture-maker. Here, the Bostitch Autoclench seals chair cartons, replacing tape and glue. Amazing tool, the Autoclench. *It fastens on the inside entirely from the outside.* Worth looking into if you use tape, wire or glue in *your* shipping room.

FREE BOOKLET *describes how Bostitch stapling equipment has cut costs on many different fastening jobs, how it can cut costs for you. Write today.*

THERE'S A BOSTITCH MAN NEAR YOU — *300 fieldmen in 123 cities in the U. S. and Canada. You can count on Bostitch service. It's always nearby.*

BOSTITCH, 602 Mechanic Street, Westerly, R. I.

Please send me your free "Time and Money Saving" book together with information based on the items checked below:

For fastening, we use: Nails ☐ Glue ☐ Tape ☐ Tacks ☐ Pins ☐ Thread ☐ Rivets ☐ Spot Welds ☐

We fasten these materials: Wood ☐ Paper ☐ Rubber ☐ Fabric ☐ Plastics ☐ Leather ☐ Light Metals ☐

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BOSTITCH®

AND FASTER

fastens it better with wire

ALL TYPES OF MACHINES FOR APPLYING STAPLES
ALL TYPES OF STAPLES APPLIED BY MACHINES

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8 Maintenance Tools
This 68-page catalog illustrates and describes tools for any maintenance need: wrenches, clamps, lathe dogs, pipe tongs, hooks, screws, etc. Specs. Catalog No. 301. J. H. Williams & Co.

9 Rust Preventive
Bulletin tells the story of a rust preventive that you can paint over rust—after wire-brushing the heaviest scale away. Gives features, tells how it works, and describes finishes. L. Sonneborn Sons, Inc.

AIR HANDLING

10 Finned Coils
Water, direct-expansion, and steam coils are featured in this 12-page catalog. Specs on all types of coils, engineering data, and design features help you select the coil you need. Data on stock-size coils rated under standard conditions. Bulletin No. 705. Bush Mfg. Co.

11 Electric Comfort Heaters
Here's a quick look at 75 models of forced-air, convection, and radiant heaters in capacities of ¼ to 100 kw. Illustrations and descriptions, quick selector chart. Catalog No. D-52. 8 pages. Edwin L. Wiegand Co.

12 Fans
In this catalog (No. J-611) you learn about the advantages of vane-axial fans with adjustable blades. Design data, typical installation photos, and application information. Spec sheets included. 16 pages. Joy Mfg. Co.

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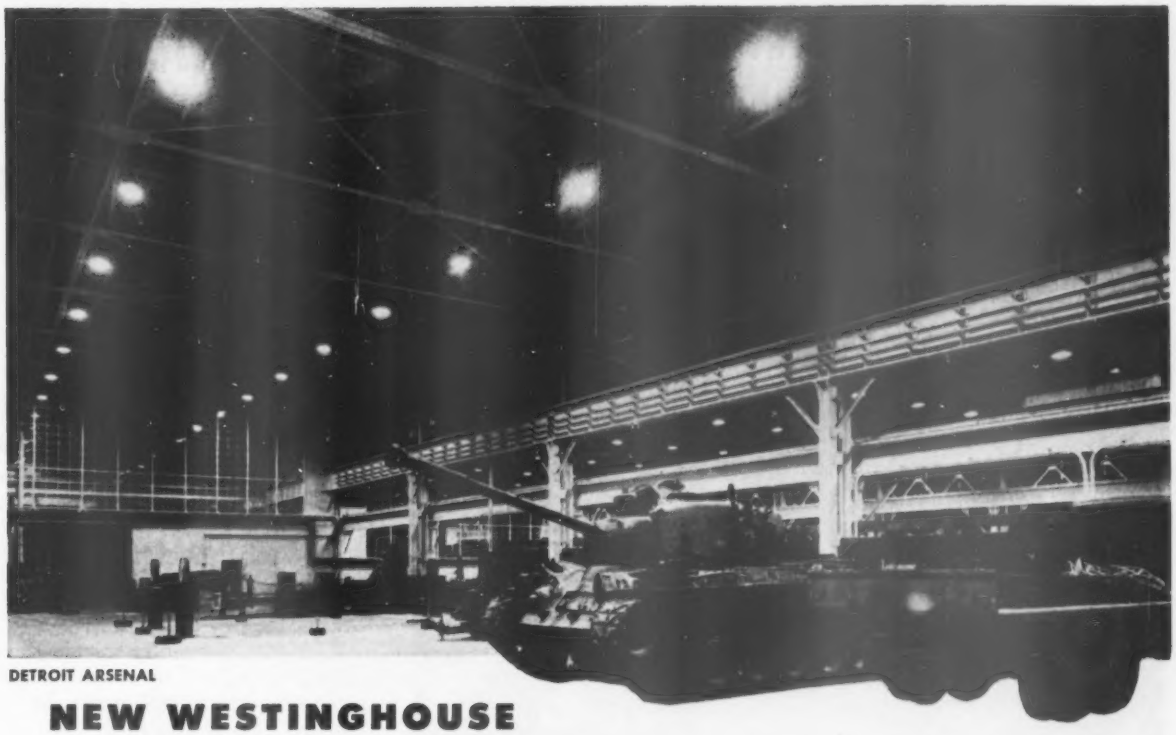

DETROIT ARSENAL

NEW WESTINGHOUSE 1000 WATT FLUORESCENT-MERCURY LAMP —*The Cheapest Source of Mass White Light!*

Brighter, higher quality light at lowest cost—that's what engineers of the Chrysler Corporation sought for this newly erected Tank Assembly Wing of the Detroit Arsenal.

As in so many other industrial installations, the new Westinghouse 400 Watt J-H1 and the 1000 Watt C-H12 Fluorescent-Mercury Lamps met the demand for longer burning life—more economical performance due to lamps of higher efficiency—and reduced maintenance costs.

A pleasant, golden-white working light is provided by the Fluorescent-Mercury Lamp, which is both flattering to personnel and suitable for most types of lighting service. The rated lives of 4,000 to 6,000 hours respectively of the 1000 Watt C-H12 and 400 Watt J-H1 assure minimum maintenance. And the J-H1 and C-H12 may be operated from ballasts now used for the 400 Watt and 1000 Watt Mercury Lamps.

Golden-White Light Shows Real Colors. Golden-white light of Fluorescent-Mercury Lamps eliminates the need for incandescent color correction, even in color-coded assembling operations. This high-quality white light improves worker morale, aids production in industrial installations of every kind. And the long 4,000-to-6,000-hour burning life of the Fluorescent-Mercury Lamps reduces maintenance costs.

These Fluorescent-Mercury Lamps are recommended for large-scale outdoor as well as indoor applications. For 480 volt lighting circuits and for street lighting where 1000 Watt lamps are to be used, the new B-H15 is recommended.

For detailed information on how the world's least expensive source of mass white light can be employed in your present or planned lighting installations, write to Lamp Division, Westinghouse Electric Corporation, Bloomfield, New Jersey.

YOU CAN BE SURE...IF IT'S

Westinghouse

SLOWDOWN In Assembly?

Not when you bundle with a SIGNODE POWER STRAPPING MACHINE!

The happiest, most envied man on the production line—*and the pacesetter*—is the man on the *Signode Power Strapping Machine!* His job is easy and light, and well-strapped bundles roll off the line automatically! But faster continuous output is not the only advantage gained.

Power Strapping Cuts Costs Also

Signode's Power Strapping Machine releases several men for other jobs. It does the job of bundling safe and faster, with uniform tension on every strap. The machine is flexible, handling packages of varying sizes without adjustment. It is highly adaptable, strapping K.D. millwork, soft and hard wood flooring, shingles, crating lumber, expensive trim, etc. Strapped millwork and lumber is easier to handle, stack and tally. It can be loaded faster and enjoys protection from pilferage until used on the job.

Let's estimate your needs

Volume shippers usually have varying strapping needs. Let our fieldman survey your production layout and recommend the power strapping machine for the job. You'll be under no obligation whatever. Write

*Another exclusive service proved and tested for you by Signode

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SIGNODE

Steel Strapping Company

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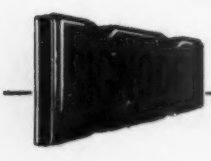
this seal means security in shipping



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AUTOMATIC CONTROLS

13 Transmission System
Here's a 20-page catalog that describes pneumatic, magnetic, electric, electronic, and electronic-follower transmission systems. Use them to measure and control any process variable. Selection and operating data. Fischer & Porter Co.

14 Liquid, Gas Controls
Outlines controls, gages, and meters needed to measure and control liquids and gases. In 32 pages you get product illustrations, construction details, and specs. Catalog No. 003. Simplex Valve & Meter Co.

MATERIALS HANDLING

15 Overhead Handling
A file folder shows how maker's equipment solved a dozen overhead handling problems. Describes track, trolleys, overhead cranes, and tractors. 12-page booklet on automatic dispatch systems included. Illustrations. The American MonoRail Co.

16 Lightweight Handling Equipment
Lightweight aluminum materials handling equipment for heavy loads and special loads is described in this 24-page file folder. Units are nonsparking for use in explosive atmospheres. Features, applications. Tobey Mfg. Corp.

17 Turret Trucks
This catalog features low-cost turret trucks for horizontal handling applications. They'll handle loads up to 2 tons, come in 5 models. Specifications and dimensions. 8 pages. Hyster Co.

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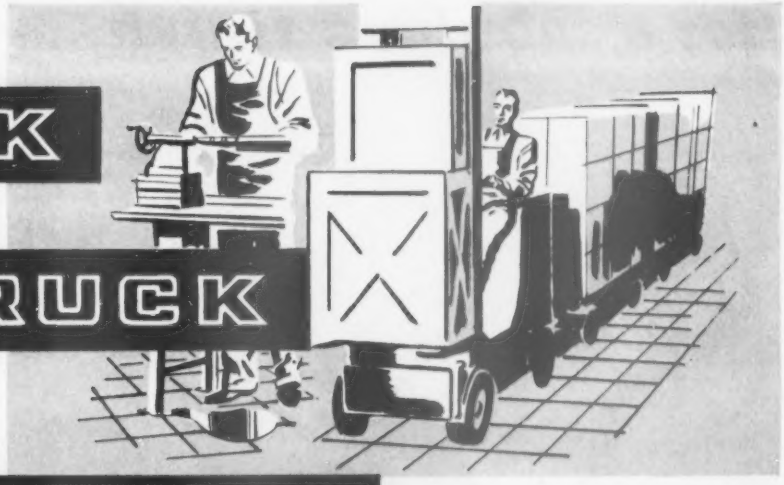


The New Vinyl Flooring All America Is Talking About!

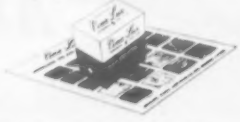
WHEN YOU WORK on Vina-Lux, you work without worry about spilled oil and grease — the dropping of heavy tools or parts. Abuse and impact resistance is built into Vina-Lux.

WHEN YOU TRUCK on Vina-Lux, you appreciate its remarkable wearing qualities — its ability to take heavy rolling loads constantly without deterioration.

WHEN YOU CLEAN Vina-Lux floors, you realize how simple and economical they are to maintain. Its tight, super-smooth surface refuses to absorb dirt — needs no waxing.

WHEN YOU VIEW your safety record with Vina-Lux floors, you'll praise its non-slip surface that makes it safer to walk or to work on — you'll appreciate its easy-on-the-feet comfort.

WHEN YOU EXPAND your facilities, you'll save money, because Vina-Lux tile by tile installation readily permits relayout of plant area with a minimum loss of valuable manufacturing time.



See your nearest Azrock flooring contractor for samples of Vina-Lux or write us for color chart and samples.

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PIPELINES & FITTINGS

18 Flexible Tubing
Flexible tubing for ventilation, fume and dust removal, and materials handling is subject of this 8-page bulletin (No. C2-4). Easy-to-use selection charts, application information, and features. Flexible Tubing Corp.

19 Small-Line Purifiers
All you need to know for selection, layout, and installation of small-line-type purifiers in this 8-page catalog. Tells how they work, where you can use them. Specifications, dimensions, and application chart. Bulletin No. 501. V. D. Anderson Co.

20 Plastic Pipe
In this 16-page catalog you'll find information on four types of plastic pipe: flexible, semi-rigid, rigid high-impact, and rigid polyvinyl chloride. Chemical and physical characteristics for each. Tells advantages, gives installation directions. Charts help you select. Triangle Conduit & Cable Co. Inc.

21 Valves
Quick valve selection is feature of this fully indexed condensed catalog on maker's valves. Illustrations and descriptions of products, sections on accessories, and useful engineering data are included. 20 pages. The Ohio Injector Co.

22 Pumps
A 96-page catalog contains detailed information on more than 20 kinds of pumps. It's indexed, and includes sectional and exterior views of the units. Selection tables and engineering data section. Catalog No. I-52. The Deming Co.

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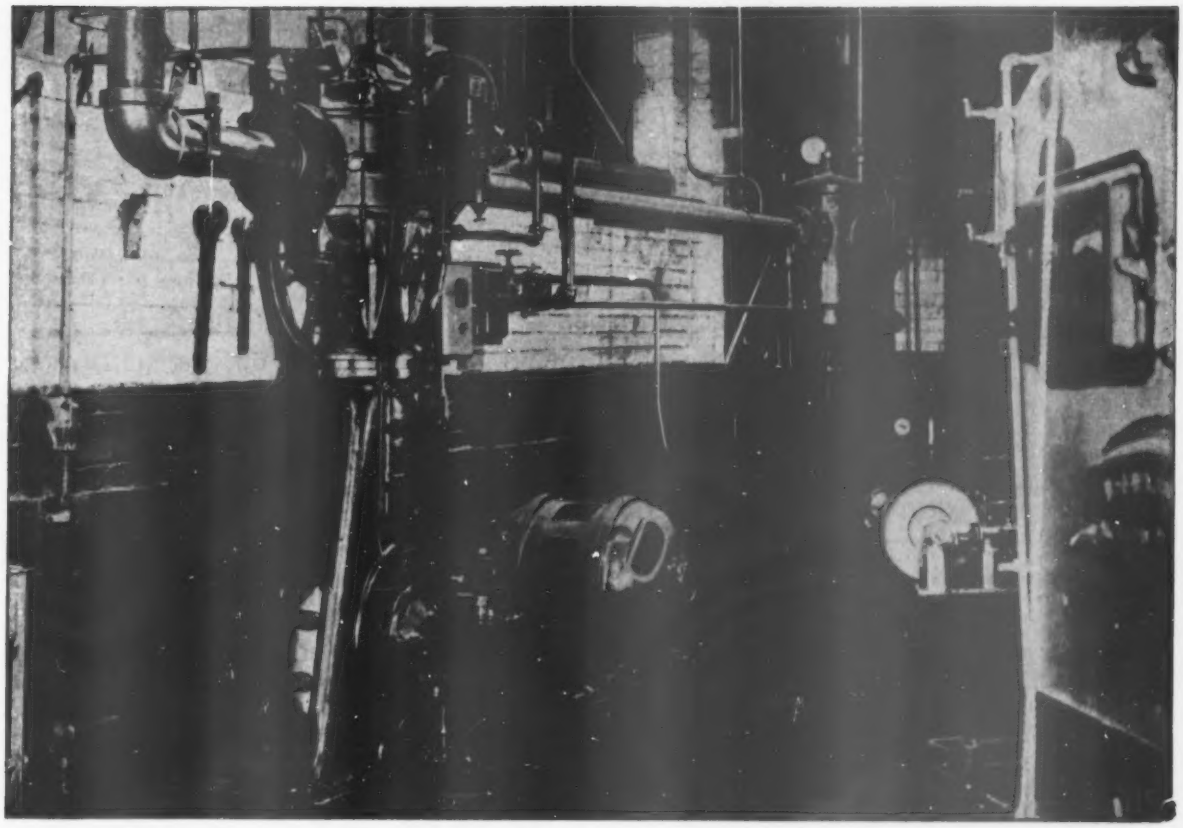


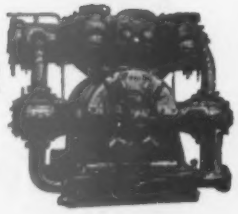
SAVE VALUABLE SPACE WITH THE EFFICIENT

JOY WG-9 HEAVY DUTY AIR COMPRESSOR

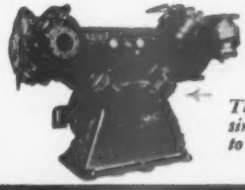
The JOY WG-9 Vertical, with its small base, saves valuable floor space. Built in a range of sizes to 881 CFM, for continuous heavy-duty service. The complete line of JOY stationary units—high and low pressure compressors, oil-free compressors, boosters and vacuum pumps—includes a type for every need, each incorporating exclusive features developed by JOY research. Supplementary products include the only complete line of vaneaxial fans and blowers, and the new JOY Oxygen Generator. ● *Write for free Bulletins.*

The JOY WL-80, in eleven sizes up to 641 CFM, with operating pressures to 125 psi.

The JOY WN-114, in single or twin units up to 7312 CFM.



The JOY WN-112, in single or twin units up to 3656 CFM.



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"THIS LUBRICANT EXTENDED BEARING LIFE 50%"

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Makers of the famous F-84E THUNDERJET

"Under actual tests, LUBRIPLATE extended bearing life fifty per cent or better as compared to other lubricants. It was also found that, during test, LUBRIPLATE increased efficiency of machines twenty per cent by reducing friction loss. Republic has been using LUBRIPLATE successfully for the past eight years."

For nearest LUBRIPLATE distributor, see Classified Telephone Directory. Send for free 56-page "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

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23 Microfilming Service
If you want to reduce storage space for your permanent records why not consider microfilming? Catalog No. BSD-5 tells how company will analyze your needs, contract the job, film, and index your records. Also describes other services offered. Remington Rand Inc.

24 Packaging Material
This folder describes a rubberized curled hair packaging material that's resistant to shock, abrasion, and moisture. Shows typical applications and outlines other advantages. Armour & Co.

25 Resistance Welders
You'll find a complete line of resistance welding machines in this 10-pager. Covers bench, rocker-arm, press, seam, butt, and multi-electrode types. Specs, illustrations, and application information for each. Catalog No. SPI-A. The Taylor-Winfield Corp.

26 Chemical-Resistant Linings
Company tells how it can line your process equipment with chemical-resistant material. Describes facilities, types of linings applied. Bulletin No. 460. Heil Process Equipment Corp.

27 Power Brushes
This 12-page catalog tells how special brushing machines help you improve difficult machining operations. Features maker's work-holder brushing lathe. The Osborn Mfg. Co.

28 Spray Nozzles
Bulletin No. 6-A contains complete technical details on a line of atomizing and spray nozzles. For each item there are construction details, spray characteristics, specs, and capacities. 20 pages. Schutte & Koerting Co.

For catalogs 29 through 46, see Plant Engineering Problems, page 264, and Plant Operating Problems, page 268.

DUPLICATE COUPON ON PAGE 144

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1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46						

Name ..... Title .....

Company .....

Street Address .....

City ..... Zone ..... State .....

STOP DOWNTIME . . .

Cut Handling Costs!

The Gould "Thirty"—
America's Finest
Industrial Truck Battery

It costs real money when a truck goes out of service because of battery failure. There are two sure ways to keep materials moving, men and machines working: 1. Power your trucks with Gould Industrial Batteries; 2. Maintain all your batteries, regardless of make, with the Gould Plus-Performance Plan. This free system of preventive maintenance is making money for hundreds of industrial firms by helping them keep their batteries new, longer.

It will pay to learn more about Gould Industrial Truck Batteries and the Gould Plus-Performance Plan. Write Gould Battery Information Headquarters for full information.

GOULD
Industrial Batteries

GOULD-NATIONAL BATTERIES, Inc., TRENTON 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

over 90% OF YOUR MATERIAL HANDLING REQUIREMENTS

— can be met with

STANDARD EUCLID CRANES,

whether they are put to Special or General Purpose use. Standard Euclid Cranes are available in capacities of 3, 5, 7-1/2, 10, 15, 20 and 25 tons in various spans.

All detail parts are standardized and jig machined to assure interchangeability.

High grade, wide face, coarse pitch gearing.

•

Shafts short and heavy to withstand stress.

•

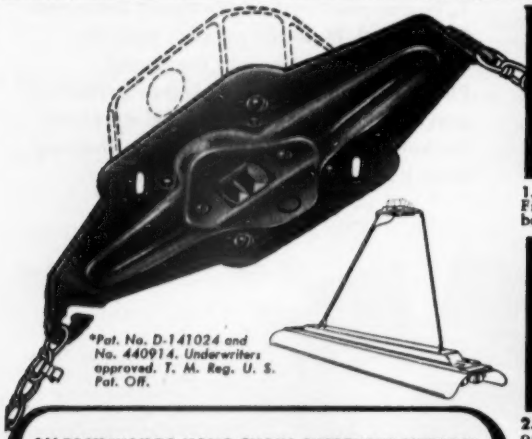
Anti-friction bearings throughout.

EUCLID CRANES AND HOISTS

Raise Profits

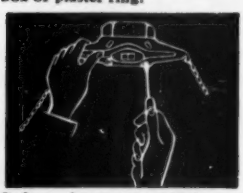
THE EUCLID CRANE & HOIST COMPANY

1364 CHARDON ROAD, EUCLID, OHIO



*Pat. No. D-141024 and No. 440914. Underwriters approved. T. M. Reg. U. S. Pat. Off.

1. Connect wires to receptacle. Fits standard 4" or 3¼" outlet box or plaster ring.



2. Screw hanger to outlet box—only two screws needed. No centering, punching, or drilling. Screwdriver only tool needed.

3. Hang the fixture and plug it in. That's all! Self-grounding—regular 2-wire cord and plug may be used.

Hydee Hanger: complete with receptacle, two 5-ft. chains, "S" hooks and clips—

AN EASY WAY TO HANG CHAIN-SUSPENDED FIXTURES IN LESS TIME... AT LESS COST... WITH LESS WORK WITH

HYDEE HANGER*

"DECIDEDLY BETTER"

DAY-BRITE *Lighting Fixtures*

01

Day-Brite Lighting, Inc., 5441 Bulwer Ave., St. Louis 7, Mo.
In Canada: Amalgamated Elec. Corp., Ltd., Toronto 6, Ontario

DISTRIBUTED NATIONALLY BY LEADING ELECTRICAL WHOLESALERS

Good Ways to Solve Special

PLANT ENGINEERING PROBLEMS

You can get catalogs suggested as answers to these problems by using coupon on page 144 or 262.

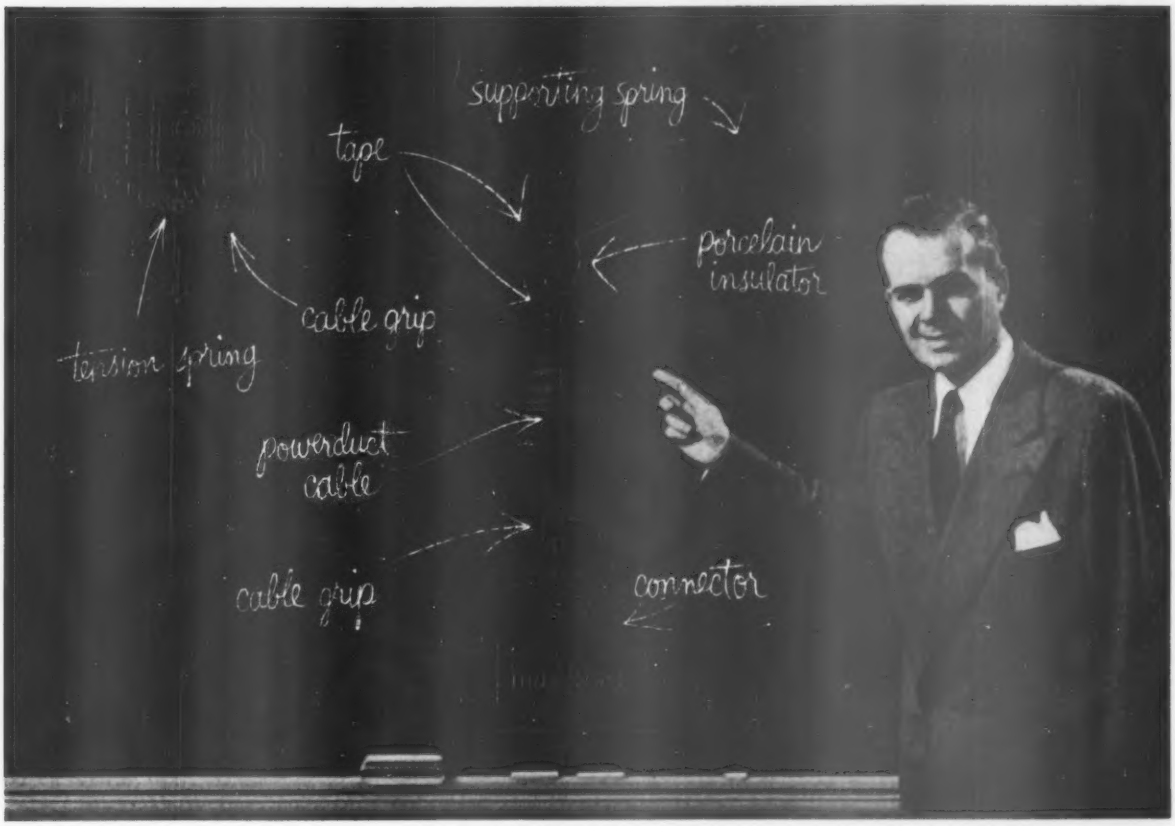
FOR ULTRA-FAST INTRA-PLANT DELIVERY SERVICE at no labor cost you can use a pneumatic tube system. Standard Conveyor Co. says its system will carry messages and records, small parts, tools, materials—may save up to $10,000 in 9 months. Bulletin No. 11. *(Circle No. 29 on coupon, page 144 or 262.)*

WHEN HEAVY LOADS CAUSE LUBE TROUBLES, an extreme pressure lubricant may be your solution. Its Sunep, says Sun Oil Co., can be used with profit on enclosed gears, plain bearings and screws. It's non-corrosive, long lasting, prevents rust. *(Circle No. 30 on coupon, page 144 or 262.)*

HOW TO ANCHOR MACHINES WITHOUT BOLTS—and control vibration: Unisorb pads and cement are made to do just that by the Felters Co. Use them for any type of machine on any kind of floor. You can get the felt pads by the yard, by the roll, or in pre-cut sizes to meet your needs. *(Circle No. 31 on coupon, page 144 or 262.)*

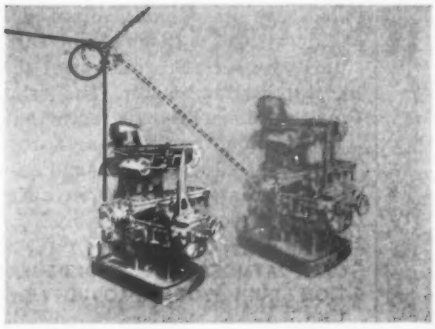
LOOKING FOR A MILDEW-RESISTANT PAINT? Nuodex Products Co., Inc., tells how to make one: Just add its Super Ad-It to any paint formulation. The fungicide prevents mildew without changing other paint properties. *(Circle No. 32 on coupon, page 144 or 262.)*

HOW TO THAW FROZEN PIPES SAFELY with your welding machine: Try Linc-Thaw, says Lincoln Electric Co. Bulletin No. 1326 tells how the protective de-



See how easily flexible Powerduct Cable plugs in. Spring keeps cable taut. For simplicity of installation and relocation, compare this cable with conduit.

No busduct system is truly flexible without this New Powerduct Cable



Mobility of machinery is increased. Powerduct Cable adds to usefulness of many types of equipment.

It's the only nonmetallic-armored busdrop cable UL approved for this hard use; cuts cost of relocating machines

Your plant may well suffer from hardening of the power arteries. Here's why. Even if you have a modern busduct system, it may be flexible *only so far as it goes.* You may still have to rip out permanent or semi-permanent wiring every time you rearrange important machines. That's costly.

Here's how to remedy this situation. Match your present busduct system with money-saving ANACONDA Powerduct Cable. It's the only cable of its type approved by Underwriters' Laboratories, Inc. for busway branches under section 3646, 1951 National Electric Code.

You save many ways. Powerduct Cable is much cheaper to install than conduit. It handles easily. Grips prevent cable creep. No time is lost. You get circuit capacity at any point for any load at any time. It's a cinch to relocate. Coil (see illustration) makes local changes easy.

How tough is it? Its flame-retardant jacket, woven like a fire hose, takes heavy mechanical abuse, won't fray. Cold-flow is no problem. Cutting compounds, oil, acid, water, grease won't harm it.

Plan now to add flexible Powerduct Cable to your busduct system. See your regular supplier and insist on the ANACONDA Trademark—your positive proof of UL approval for this use. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 52371

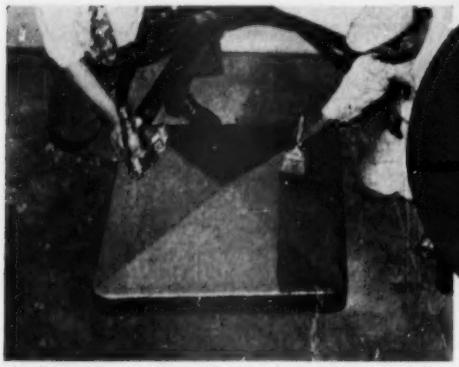
the right cable for the job

ANACONDA®

wire and cable

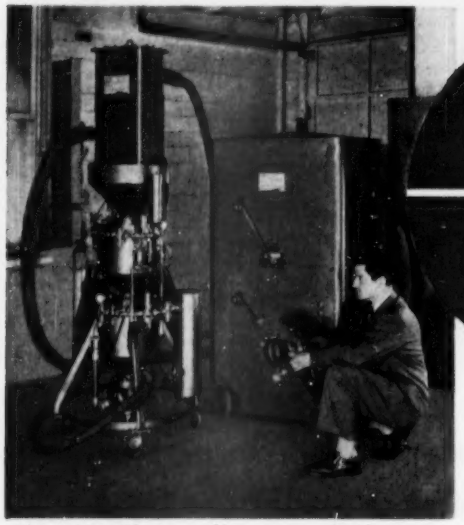
BLAST CLEANING
WITHOUT DUST OR GRIT

VACU-BLAST scours the surface, eats the dust and reclaims the abrasive — all at once!

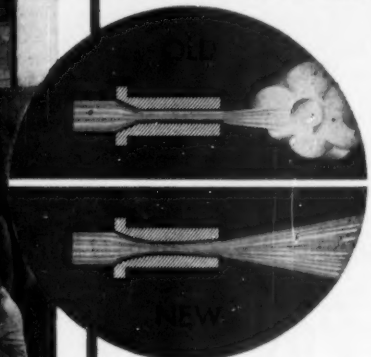


Right in the midst of your working shop, Vacu-Blast removes rust, paint and scale from metal, masonry and wood with a thoroughness and efficiency that only abrasive blasting provides. Surfaces are perfectly prepared for welding, painting or process requirements, yet there's no dust or scattered abrasive to interfere with other operations.

The abrasive, dust and debris are confined within the blast gun — they are picked up by Vacu-Blast's unique, patented vacuum return. The blasted surface is left clean and dustless. Your shop is protected from the nuisance of scattered dust and grit. Valuable abrasive is reused numerous times.



This is Vacu-Blast's working team — the blast gun — the combination generator/reclaimer, and the dust collector. All are compact, portable and easy to move around.



Newest Vacu-Blast improvement is the flared, high efficiency nozzle that does up to 25% more work per hour than previous nozzles. Developed through extensive research, the throat design of this new nozzle eliminates inefficient shock waves, resulting in full power flow of abrasive. This new nozzle is now provided on all Vacu-Blast equipment, and has been made available to all present users.

VACU-BLAST CO. INC.

Please send specific detail information applying to the _____ business.

Firm_____

Address_____

Signed_____

Write for free booklet

Begins on page 264

Good Ways to Solve Special PLANT ENGINEERING PROBLEMS

You can get catalogs suggested as answers to these problems by using coupon on page 144 or 262.

vice will prevent overload damage to engine-driven welding machines. Works on any make or model. *(Circle No. 33 on coupon, page 144 or 262.)*

IF YOUR FILTER CLOTHS ARE WEARING OUT fast—and your patience, too—Dynel filter cloth may help spare both. It's highly resistant to strong caustics and rigorous operating conditions, according to Carbide & Carbon Chemicals Co. *(Circle No. 34 on coupon, page 144 or 262.)*

TO CUT COSTS IN SPRINKLER SYSTEM INSTALLATION, Nelson Stud Welding suggests attaching ceiling hangers by Nelwelding. Fast, easy, positive. A 33-page booklet describes equipment and procedure. *(Circle No. 35 on coupon, page 144 or 262.)*

NEED CHEMICALLY PURE WATER FOR PROCESSING? Penfield Mfg. Co. says its Mono-Column demineralizer will provide high purity water at a fraction of the cost of distilled water. The automatic units will treat more than 5000 gallons per hour at a cost of less than 15¢ per thousand gallons of treated water. *(Circle No. 36 on coupon, page 144 or 262.)*

CAN ATMOSPHERIC CONDENSATION RUIN YOUR PRODUCT? Investigate a Foxboro automatic control system. It will maintain the temperature of the stored material above the dew point of the air, according to Data Sheet No. 000-8. *(Circle No. 37 on coupon, page 144 or 262.)*

Turn the page

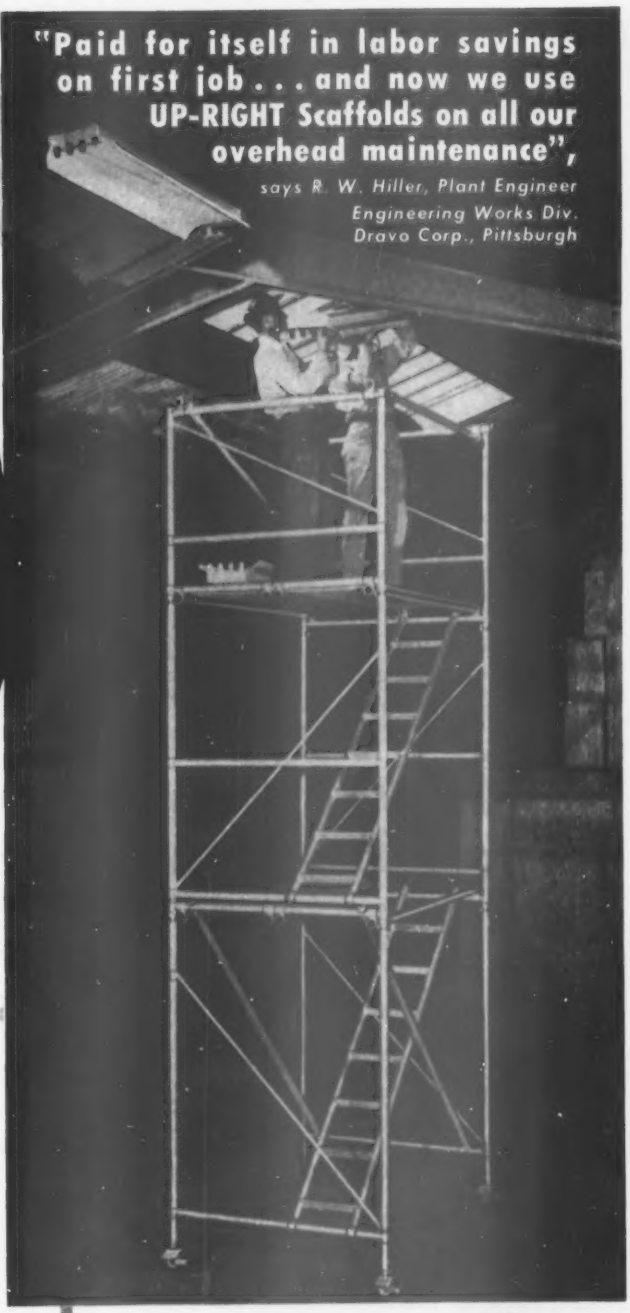
Presto... it's UP!

17 ft. "UP-RIGHT" SCAFFOLD-ON-WHEELS set up in only 3 minutes!

As if by magic, an aluminum alloy tower of any height desired is ready in minutes! Individual scaffold sections are set one on top of the other. Sections lock into place instantly.

"Paid for itself in labor savings on first job . . . and now we use UP-RIGHT Scaffolds on all our overhead maintenance",

says R. W. Hiller, Plant Engineer
Engineering Works Div.
Dravo Corp., Pittsburgh

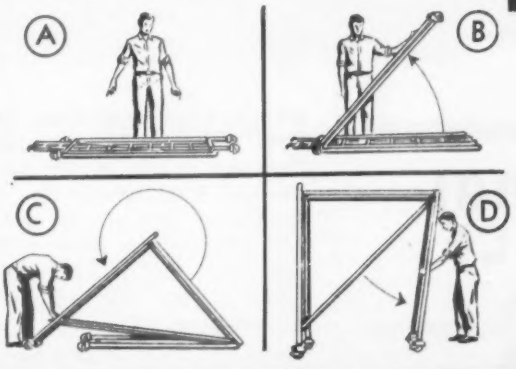


HERE'S THE SECRET!...

PATENTED

ONE-PIECE SECTIONS

Each one-piece section is unfolded by one man in less than a minute! No tools, wing nuts or bolts.



Your maintenance costs can be reduced by "UP-RIGHT" SCAFFOLDS

WRITE FOR DESCRIPTIVE CIRCULAR

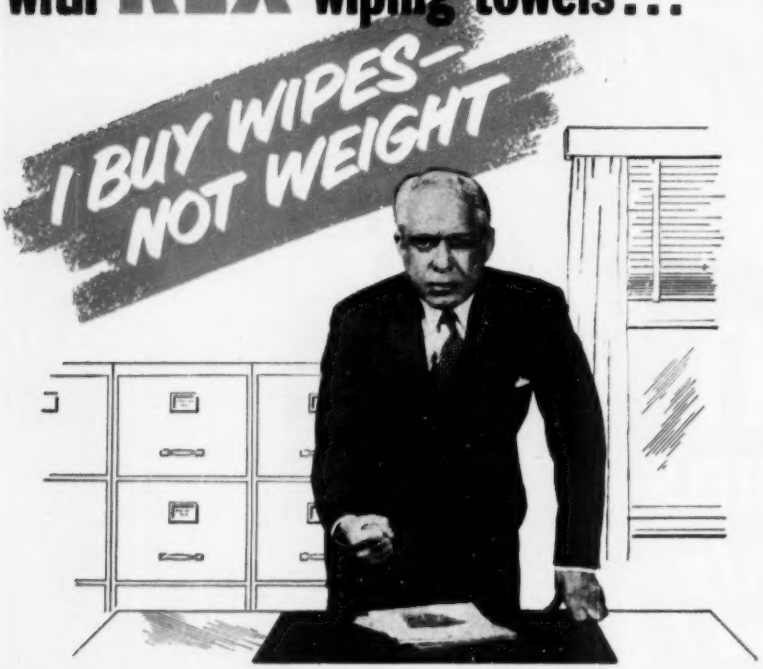
"UP-RIGHT" SCAFFOLDS

DEPT. 104 • 1013 PARDEE ST. • BERKELEY, CAL.

Factories: Berkeley, Calif. & Teterboro, N. J.

Offices in all principal cities

with KEX wiping towels...



Because Every Square Inch is Usable—and KEX Industrial Wiping Towel Rental Service...

- Is more economical
- Supplies towels that are safe to use
- Simplifies handling
- Saves man hours
- Better equips our men
- Relieves me of shopping around
- Is a national service I can depend on
- Is available to *all* my plants

For complete information see your Classified Telephone Directory for nearest Kex distributor, or write Kex National Service, 295 Fifth Avenue, New York 16, N. Y.

"KEX" NATIONAL SERVICE

REG. U.S. PAT. OFF.

It isn't Kex unless it's imprinted with the Kex name

Good Ways to Solve Special PLANT OPERATING PROBLEMS

You can get catalogs suggested as answers to these problems by using coupon on page 144 or 262.

FOR FASTER LAYOUT PLANNING, Chart-Pak, Inc., suggests its preprinted layouts. A wide variety of pressure-sensitive tapes represents equipment and structural components to scale. You just stick them in place on layout sheets. *(Circle No. 38 on coupon, page 144 or 262.)*

TO PREVENT DETERIORATION OF COATED ABRASIVE QUALITY, you have to store the material properly. Armour & Co. tells all you need to know in an 8-page booklet. *(Circle No. 39 on coupon, page 144 or 262.)*

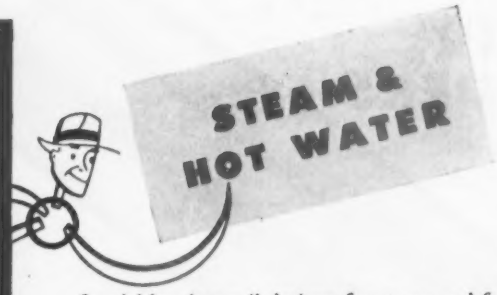
NEED TRAINED WELDERS? Eutectic Welding Alloys Corp. runs a welding institute that turned out 562 advanced welders last year. One-week courses teach a full range of joining processes. *(Circle No. 40 on coupon, page 144 or 262.)*

WHAT CAN YOU DO WITH FLAME PLATING? This and other questions about the new wear-resistant coating process are answered by Linde Air Products Co. in its 12-page booklet. Describes coatings you can use, outlines their wear characteristics. *(Circle No. 41 on coupon, page 144 or 262.)*

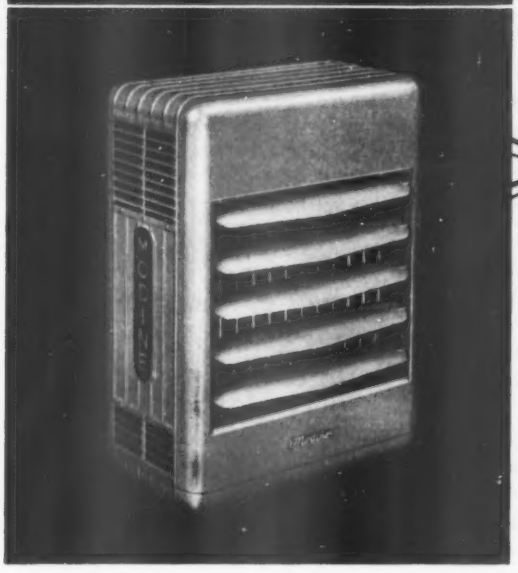
WHAT'S YOUR SCREENING PROBLEM? There may be a Sweco Separator to solve it, says Southwestern Engineering Co. The equipment will screen wet or dry, fine or coarse, heavy or light materials. And at low cost, the company adds. *(Circle No. 42 on coupon, page 144 or 262.)*

Turn the page

Choose the right unit heater from Modine's complete line . . .



Special heating coil designs for steam and for hot water assure best performance for each type of system. Discharge air temperatures of 110-120°F are correctly related to air velocity for heating at its best. All-copper coils defy corrosion because fins are bonded to tubes and tubes are brazed to headers. Pre-formed tubes with individual expansion bends absorb stresses, assure long life. Built in Horizontal and Vertical Delivery (illustrated) and Power Throw types — 47 different models.



Modine is the only gas unit with both *stainless steel* heat exchanger and burner. Lighter weight and less bulk mean easier, less expensive installation, plus faster heat delivery — *within five seconds* after thermostat calls for it. Individually fired tubes provide higher heat transfer. Elongated ports — four times free area of conventional drilled ports — minimize clogging and simplify routine cleaning. Five popular sizes, A.G.A. approved for mixed, natural, manufactured, L.P. and L.P.-air gases.

It pays to buy the greatest name in unit heating

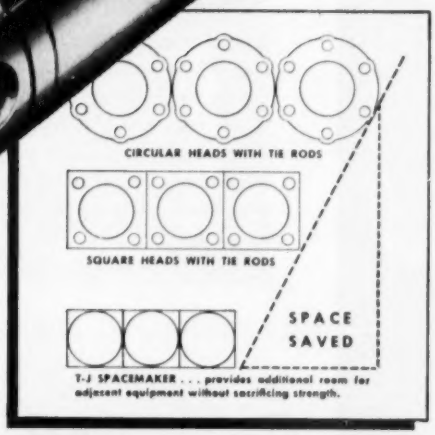
For more than 25 years, the name Modine has been closely identified with the development of unit heaters and their application to industrial and commercial heating. And the widespread acceptance of unit heating today is due in large part to Modine's improvements in production, design and performance. For an unbiased analysis of your heating problems, call the Modine representative listed in your classified phone book. Or write Modine Mfg. Co., 1505 DeKoven Ave., Racine Wisconsin.

Ask for Bulletin 149-A on steam and hot water and Bulletin 652 on gas-fired unit heaters.

Modine
UNIT HEATERS

U-1195

NEW T-J Spacemaker AIR CYLINDERS


CIRCULAR HEADS WITH TIE RODS
SQUARE HEADS WITH TIE RODS
SPACE SAVED
T-J SPACEMAKER . . . provides additional room for adjacent equipment without sacrificing strength.

- SAVES UP TO 40% SPACE WITH NEW STREAMLINED DESIGN.
- SUPER STRENGTH . . . EXTRA HIGH SAFETY FACTOR.
- SOLID STEEL HEADS.
- HEAVY WALL, PRECISION HONED, HARD CHROME PLATED SEAMLESS STEEL BODY.
- LEAKPROOF CYLINDER HEAD TO BODY CONSTRUCTION.
- RELATIVE PORT POSITIONS MAY BE ROTATED WITHOUT DISASSEMBLY OF CYLINDER AND LOCKED IN DESIRED POSITION.
- HEAVY DUTY, HI- TENSILE, HARD CHROME PLATED PISTON ROD.

Streamlined construction of the new T-J Cylinders *eliminates tie rods . . . reduces head size . . .* and *saves up to 40% in mounting space!* In addition, a new high in strength is achieved with solid steel heads and heavy wall seamless steel body . . . leakproof construction . . . extra high safety factor.

Cylinder walls are precision honed and hard chrome plated for long-life efficiency. Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles . . . both cushioned and non-cushioned . . . for wide range of pushing, pulling, lifting, clamping or control jobs. T-J dependability. *Fast delivery* to meet rush requirements. Write for bulletin 8152. The Tomkins-Johnson Co., Jackson, Mich.

Many More Advanced Features!

37 YEARS EXPERIENCE

T-J TOMKINS-JOHNSON

RIVITORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS

Begins on page 268

Good Ways to Solve Special PLANT ▶ OPERATING PROBLEMS

You can get catalogs suggested as answers to these problems by using coupon on page 144 or 262.

ARE VIBRATORS NOISY? Not the Air Cushioned air vibrator, says Cleveland Vibrator Co. You can use it for a wide range of materials—from cinders to powdered soap. It's noiseless because the momentum set up by the piston is cushioned by a pocket of air at each end of the vibrator assembly. (*Circle No. 43 on coupon, page 144 or 262.*)

CAN AIR POWER DO MORE WORK FOR YOU? Mead Specialties Co. bets it can, and to prove it offers a 56-page catalog on its full line of equipment: single and double-acting air cylinders, air-operated presses, chucks, valves, hammers, work feeders—all designed to boost production. (*Circle No. 44 on coupon, page 144 or 262.*)

ALCUPLATE OR BONDWICH? Not from a menu. Just the names of two typical composite metals made by General Plate Div. of Metals & Controls Corp. Bulletin No. PR700 tells what other composite metals, precious metals, and electrical contacts are available, gives properties, and suggests uses. (*Circle No. 45 on coupon, page 144 or 262.*)

TO CUT METAL CLEANING COST, have you tried cold cleaners? E. F. Houghton & Co. says you get lower operating and maintenance costs because no heat is required. Also, you can eliminate steam lines, ventilators, stacks, exhaust fans, and other equipment. Bulletin No. 2-539 describes Hough-to-Clean 439 and 440. (*Circle No. 46 on coupon, page 144 or 262.*)

Enter this Lyon Den with Confidence

There are two big reasons why your Lyon Steel Equipment Dealer is a good man to know.

First, a highly diversified line of more than 1500 standard Lyon items enables him to meet the varying needs of business, industry and institutions — *better.* (A very few typical Lyon products are shown below.)

Second, he's a source of sound counsel in getting the most out of steel equipment in terms of savings in time, labor and money.

Lyon also has complete design and production facilities for special contract work.

FACTORIES IN . . . AURORA, ILL., AND YORK, PA.

LYON METAL PRODUCTS, INCORPORATED

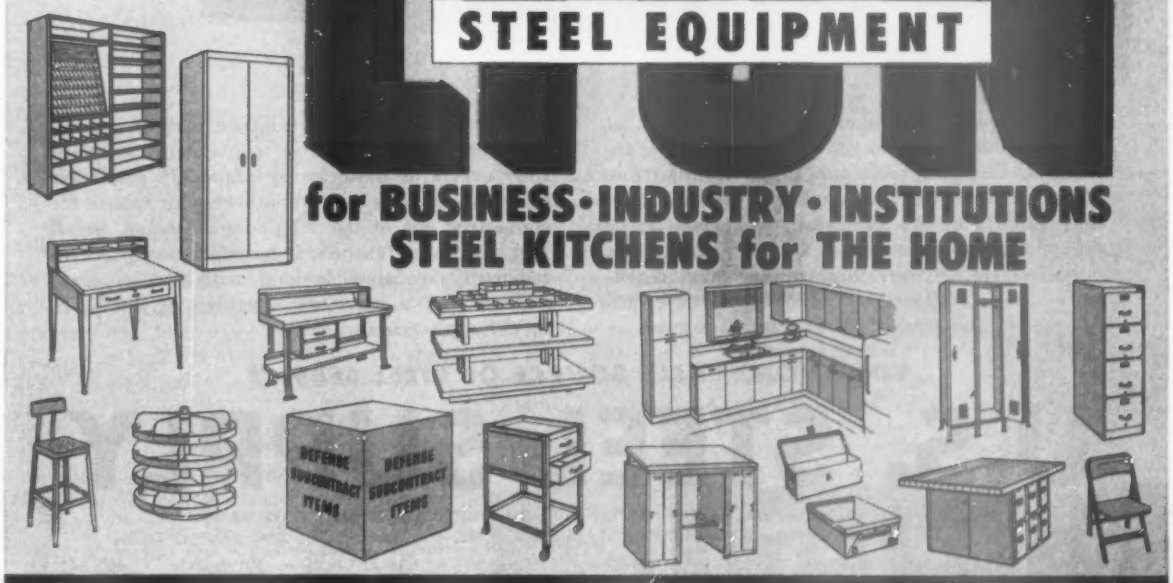
General Offices: 212 Monroe Avenue, Aurora, Illinois

Sold Nationally Through Dealers and Branch Offices

LYON

STEEL EQUIPMENT

for BUSINESS • INDUSTRY • INSTITUTIONS
STEEL KITCHENS for THE HOME



A PARTIAL LIST OF LYON STANDARD PRODUCTS

- Shelving
- Lockers
- Stools
- Bin Units
- Kitchen Cabinets
- Cabinet Benches
- Storage Cabinets
- Drawing Tables
- Tool Toters
- Bar Racks
- Tool Boxes
- Parts Cases
- Economy Locker Racks
- New Freedom Kitchens
- Toolroom Equipment
- Wood Working Benches
- Display Equipment
- Flat Drawer Files
- Revolving Bins
- Hanging Cabinets
- Filing Cabinets
- Folding Chairs
- Work Benches
- Bench Drawers
- Service Carts
- Sorting Files
- Drawer Units
- Hopper Bins
- Tool Stands
- Shop Boxes
- Tool Trays
- Shop Desks

The U. S. Steel Supply team that gives you

personalized service

Our *telephone salesman* is your "on-the-spot" assistant!

OUR telephone salesmen are trained to look at your business from *your* viewpoint. They are your "on-the-spot" assistants in our organization. When you want steel or supplies or need information quickly about availabilities, priorities or prices, pick up your phone and call one of our salesmen. He can turn your inquiry into immediate action and follow it through, if necessary, until you receive the steel or information you want.

Most of our customers call their telephone salesman, because it suits their convenience to place their orders or inquiries by phone. It gets their steel buying done fast! Whatever your reason for contacting one of our telephone salesmen, you'll find that your business is handled promptly, intelligently, courteously and with the personal interest that marks every member of the U. S. Steel Supply team.

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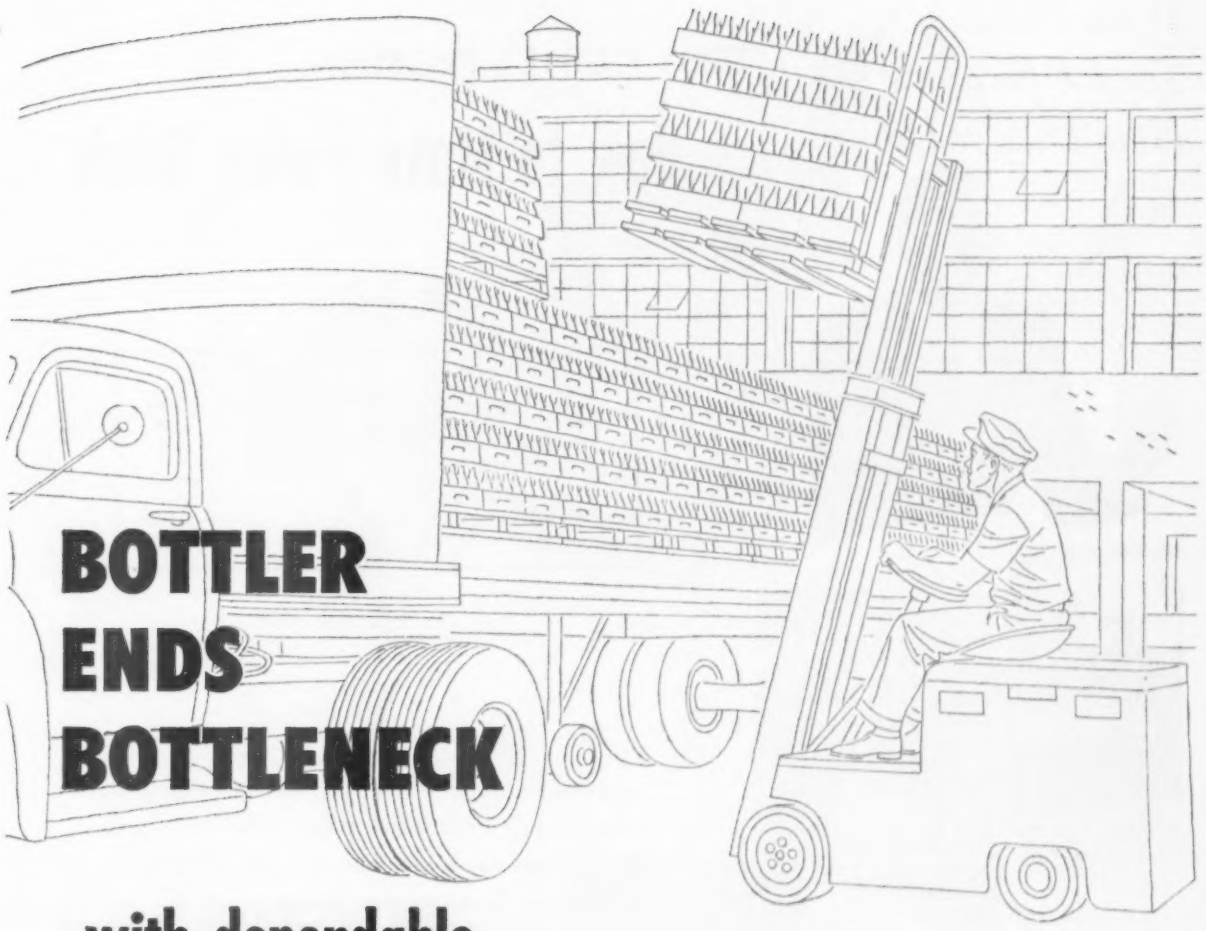
USS

UNITED STATES STEEL



BOTTLER ENDS BOTTLENECK

with dependable EDISON batteries

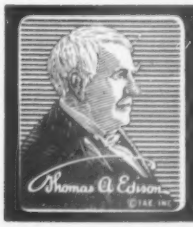
HEAVIEST WORK comes at day's end for an eastern bottler of one of the country's most popular soft drinks. After batteries have been powering fork trucks all day serving bottling machinery, fifty highway delivery trucks must be unloaded and re-loaded.

POWER TO SPARE for this big shift-end job is provided by dependable EDISON batteries. In twelve minutes, one man and a fork truck unload and re-load a delivery truck—a job that formerly took four men twenty minutes.

BEFORE RECHARGING, batteries have sometimes remained in service nearly sixteen hours continuously. Spare batteries are used only when operations continue far beyond an eight hour shift. Further, the ability of EDISON batteries to take a quick boost-charge during lunch hour has been a big factor during the busy season.

ON ALL COUNTS—dependable power through extra hours and extra years . . . lower maintenance cost . . . less downtime—EDISON batteries are best for your job. Electrically, they're practically foolproof. Their steel cells make them practically indestructible. Have your Edison field engineer survey *your* battery needs. Send for Bulletin S.B. 2039 and S.B. 3808 for detailed information. Edison Storage Battery Division of Thomas A. Edison Incorporated, West Orange, N. J.

***Most Dependable Power —Lowest Over-all Cost ... you get both with an* EDISON**



EDISON

Nickel · Iron · Alkaline

STORAGE BATTERIES

With This, Your Operators SEE How They're Doing!

With Dial Indicator Gages the operator sees how she's doing. She isn't working blind.

THIS POINTER shows the machine operator not only when workpieces are within dimension tolerances — but warns him when his work is approaching out-of-tolerance. He sees ahead of time and avoids outsized work and wasteful scrap. — You save money.

You don't always save money by using old-style gages just because they're paid for. And, old-style fixed type gages may seem faster to the operator but he's working blind when he uses them. He can't tell when he's going to produce scrap until he's already doing it. — You lose.

Every day, Dial Indicator Gages are *making* money. Ask us to show you what we've got. It's a big line of very useful Gages. Ask us about them. Federal Products Corporation, Providence 1, Rhode Island.

FEDERAL

Largest manufacturer of indicating type gages... exclusively

FEDERAL PRODUCTS CORPORATION
1332 Eddy Street, Providence 1, R. I.

I would like to discuss a gaging problem with you.

I am interested in your latest improved gage or gages and enclose ☐ sketch ☐ blueprint showing the dimension(s) we wish to check.

Name.....

Company.....

Street.....

City.....

State.....

TOBY QUINT'S PROBLEM:

How to Make Policy Stick

Toby's got himself a real problem. He knows the memo was sent. Red swears he never got it. What can he do to make sure policy memos reach all the way down the line — and then get read and digested? If you have an answer tell us about it in 200 words or so. FACTORY will pay for acceptable contributions at regular rates.

Remember this? FACTORY asked the question in September 1952, when author Ray Sherman's Tobias Quint was having trouble getting executives and foremen to remember company policy.

The Problem

"Savvy Mike," old employee of Central Manufacturing, was taken off the payroll by Foreman Red Kane because Mike had overstayed a leave of absence, limited by company policy to one month. Much trouble resulted because policy had been changed to two months for such leaves. Red insisted he had never been informed. Plant Manager Toby Quint insisted he had. Question finally became:

"How can we avoid this kind of mess in the future?"

The Answers

Some 29 FACTORY readers came up with variations on the same basic answer—the one that hits closest to the problem.

Here's how reader R. E. Lattinville (Bay States Abrasive Products Company, Westboro, Mass.) puts it:

". . . Have a master list of people expected to enforce policy. This would be the mailing list for all company policies, and should be kept up to date.

"Each of these men would have a folder for filing policy memos only. Memos should always be written on a special colored paper. Attached to the memo would be a rider which must be signed and returned with the following checked off: Date memo received. Do you agree with this policy? Should it be discussed at the next foremen's meeting? Any other comments?

"The returned rider should be checked against the master list to make sure everyone received the memo. The memo must be read and understood to answer the questions on the rider."

Turn the page

SPANG CW

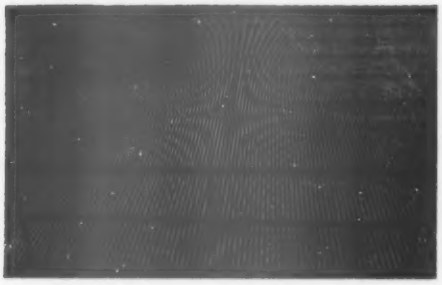
keeps West Virginia's skaters on their toes

Figure skaters never worry about the weather in Huntington, West Virginia. In their new million dollar recreational center the ice stays hard and fast all during the season. And it's kept that way day after day by a refrigerant flowing through a welded web of Spang CW Steel Pipe under the entire skating area.

Wherever long time reliability is a must—whether in skating rinks or the largest commercial buildings—architects, contractors, owners consistently specify dependable Spang CW. They know from experience that the name Spang is a guarantee of year after year of maintenance-free service.

Quality-controlled from steel to finished form, Spang CW is always uniform in every dimension. Easy to cut, easy to weld, easy to bend, it's the *easy* way to reduce installation time and costs.

Specify Spang CW Steel Pipe by name—you'll find leading distributors in every section of the country.



Owners: Cabell County Recreation Board Architect: Lewis E. Stettler
Contractors: Frick Company, Waynesboro, Pa.

SPANG

SPANG-CHALFANT

DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Office: Grant Building, Pittsburgh 30, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis

A Case of "SWEETER" PICKLING

THE COMPLAINT: At the Geo. D. Roper Corp. plant, Rockford, Ill., metal parts for Roper Gas Ranges are processed through a series of pickling operations by means of an 185 ft. continuous conveyor. Driven by two 1½ hp. motors about 90 ft. apart, the conveyor chain automatically stops at regular intervals to "dunk" range parts into the pickling tanks. Continuous start and stop operation caused the two motors, originally matched, to work against each other, resulting in repeated conveyor chain breaks and overtaxed motors.

THE REMEDY: A Twin Disc HYDRO-SHEAVE Drive was installed on each motor. With no change in loads or general conditions, motors no longer fight each other. Normal 4% fluid slip in the couplings results in smooth, steady operation, and an end to chain breakage. The Twin Disc HYDRO-SHEAVE Drive absorbs starting and overload shocks, allows the motors to build up to an efficient speed before picking up the load, and reduces wear on *all* working parts.

In thousands of applications—indoors and out—Twin Disc Industrial Fluid Drives are providing similar savings. For help on your problems, write Twin Disc or contact your nearest Twin Disc Hydraulic Dealer.

HYDRO-SHEAVE® Drive—Sizes 7.4s to 12.2 for motors and engines ¾ to 50 hp.

Built for a Long Life . . .
Backed for a Lifetime

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

HOW TO MAKE POLICY STICK

Begins on page 274

Three-Step Program

Reader S. M. Reich (Home Laundry Department, General Electric Company, Bridgeport, Conn.) doesn't think the above is sufficient. He suggests a three-step program:

"First, basic indoctrination . . . Subject the foremen to a lecture and discussion course on the provisions of the union agreement and their application; the details of company policy and procedures related to employment and personnel practices, etc.

"Second, access to pertinent information. Issue bulletin on amendments to the basic information and the effect of these on current practice . . . Have each supervisor affix his signature to acknowledge receipt of a copy of the bulletin.

"Third, two-way communication. At least once a month, the plant manager conducts a meeting of all supervisors . . . The manager is thus advised firsthand of employee relations activities at the first level of management . . . Official interpretations of new rules and developments are given verbally, and general discussion is encouraged . . ."

Other Suggestions

R. L. Moore of Detroit points out that there are lots of procedures to get the memos into foremen's hands. One suggestion that should have value for speed in getting changes passed on is this: "Deliver policy changes by messenger and require each supervisor to sign a receipt as he accepts the new policy." This is practical, Moore feels, because policy changes in a stable organization will not occur frequently.

Moore then adds this interesting comment about the value of learning by teaching: "Where important changes in policy occur, it is good practice to get the

Solves leakage problem . . .

● Multi-clean Products, Inc., St. Paul, Minnesota, manufactures industrial floor polishing and scrubbing machines. The machines are shipped with grease already installed in gear reduction units. The problem faced by this company was one of finding a grease that would stand up under hard service and not leak from the gear units. Greases tried either caused or threatened leakage troubles.

Called in on this problem, a Standard Oil lubrication specialist recommended STANOBAR Grease "S", a highly stable grease with a unique adhesive characteristic. Given an accelerated service test, STANOBAR did not leak from the gear unit, and its consistency showed no change that would later cause a leakage problem. There was no wear of gears or bearings. Adopted for use in the units, STANOBAR has solved this company's lubrication problem on every count. Officials have been able to eliminate the costly and troublesome practice of having all units returned to the factory, at 12 months intervals, to be repacked with grease.

STANOBAR
TRADE MARK
Grease

The same lubricating qualities of STANOBAR that solved this problem for Multi-clean Products, Inc. can serve you in a wide variety of applications A Standard Oil lubrication specialist will be glad to discuss those applications with you. He's right there in your section of the Midwest. You need only phone your local Standard Oil office. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

What's YOUR problem?

C. L. Daub of Standard Oil's Minneapolis office is the lubrication specialist who helped Multi-clean Products, Inc. solve an important lubrication problem through his recommendation of STANOBAR Grease.

Like all Standard Oil lubrication specialists, he has a broad background of practical experience plus thorough training in Standard's own schools. And like all lubrication specialists, his on-the-job assistance is always available to the industries in the immediate area he serves. He is one of a corps of experienced men who make their headquarters wherever industry is located throughout the Midwest. Call for the services of your Standard Oil lubrication specialist today. When he stops at your plant, be sure to get information on these outstanding products:

STANOIL Industrial Oils— This multi-purpose line of oils provides cleaner operation of hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems. One of two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants— On open gears and wire rope, these greases resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

STANORUST Rust Preventives— The eight grades of STANORUST form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specially developed for its intended use. The grades range from a fingerprint remover to a heavy semi-solid that protects against corrosion for years under the most severe outdoor exposure.

STANDARD OIL COMPANY

STANDARD *(Indiana)*

This big Pangborn "CH" Collector, at Garden City Foundry, Stoughton, Wis., serves the foundry's grinding wheels and its Pangborn Blast Cleaning Machines. Result: Plant and equipment are protected from excess abrasive dusts, and employees work in a dust-free area!

GOT a DUST PROBLEM?

***Here is the hood** and piping system which conveys dust laden air to Pangborn Collectors at Middlesex Silver Co., Middletown, Conn. Valuable silver fines recovered with this system are worth $15,000 a year, after all operating costs of the system have been paid!*

***This one Pangborn** installation solved six dust control problems for Kingsbury Machine Tool Co., Keene, N.H. Heating costs have been lowered substantially through recirculation of cleaned air, costly dust damage to machinery and products has been prevented, and workers' efficiency has increased!*

THE THREE EXAMPLES you see here are actual case histories of dust problems solved by Pangborn Dust Control Equipment. In each case, Pangborn engineers studied the problem, recommended a solution, and worked closely with plant supervisory personnel in securing the greatest benefits possible from the dust control equipment.

Not that these examples are unusual; they're typical of Pangborn's day-to-day operation. Improving working conditions, removing dust hazards, improving community relations, saving money through reclamation and salvage of the dust collected — these are Pangborn's stock-in-trade — these are the benefits literally thousands of plants are enjoying, thanks to Pangborn.

What are your Dust Problems? Find out what Pangborn can do to solve them. Write for Bulletin 909A. Address: PANGBORN CORP., 2100 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the latest developments in Dust Control and Blast Cleaning equipment

Pangborn DUST CONTROL

STOPS THE DUST HOG from stealing profits

HOW TO MAKE POLICY STICK

Begins on page 274

people concerned together and explain the new policy. *Had the foreman explained this new policy to his workers, he would not have forgotten about it himself."* (italics added).

Another variation on procedure—a little slower, but equally effective—comes from Dayton, Ohio. Works Manager G. E. Loges, of The Kramer Brothers Foundry Company, writes:

"Toby's problem isn't so difficult. Let's assume he has 10 men along the line who must receive policy memos. He should make 12 copies of the memo. A route slip lists the 10 names involved.

"One copy goes to a follow-up file; the other 11 copies go to the first name on the route slip. This man signs the master copy, takes one copy for his file, and sends 10 copies to the second name on the list. The second man signs master copy, takes one copy, and sends 9 copies to the next name, etc., etc. The tenth man gets two copies, keeps one, and signs the master copy, which now has 10 signatures. This master copy now returns to Toby. Each man has a copy of the memo, and Toby has a record that each man has received his copy. Q.E.D."

Finally, this sound warning comes from G. H. Horwood of Montreal, Canada, as part of his answer:

"I would say at the outset that Central Manufacturing is badly in need of a company policy arrangement, judging by the immature reactions of its executive members at a conference. First, I would suggest that the president and the plant manager get together to decide what the company policy is. Obviously, neither seem to know it at the present."

(*Editor's note*: These highlights of the many answers received from FACTORY readers are all that space permits. To everyone who sent in answers, our sincere thanks.)

What do you do when you don't have the right size v-belt in stock?

1

Contact your supplier for a replacement

...and wait for delivery
...wait—and watch production stay at zero

2

Send someone to get the required belt

...and pay your employee while he goes for the belt
...pay through loss of production

3

Stock VEELOS...

...and always have the *right* size belt when you need it
...any length can be made up from a 100-foot reel
...inventory is automatically maintained
...available from 350 distributors

GET ALL THE FACTS

This Veelos Data Book gives complete details about construction, installation and uses. Write for free copy of this money-saving book today.

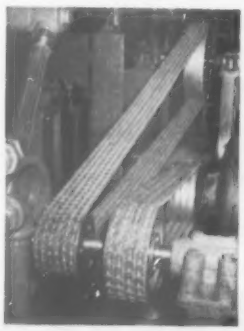
MANHEIM MANUFACTURING & BELTING COMPANY
604 Manbel St., Manheim, Pa.

VEELOS in stock is Production Insurance

Belts for replacement always on hand—just 4 reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts.

Link construction permits quick installation—without removing outboard bearings.

Adjustability provides controlled tension on each belt—vibrationless, full power delivery is assured.

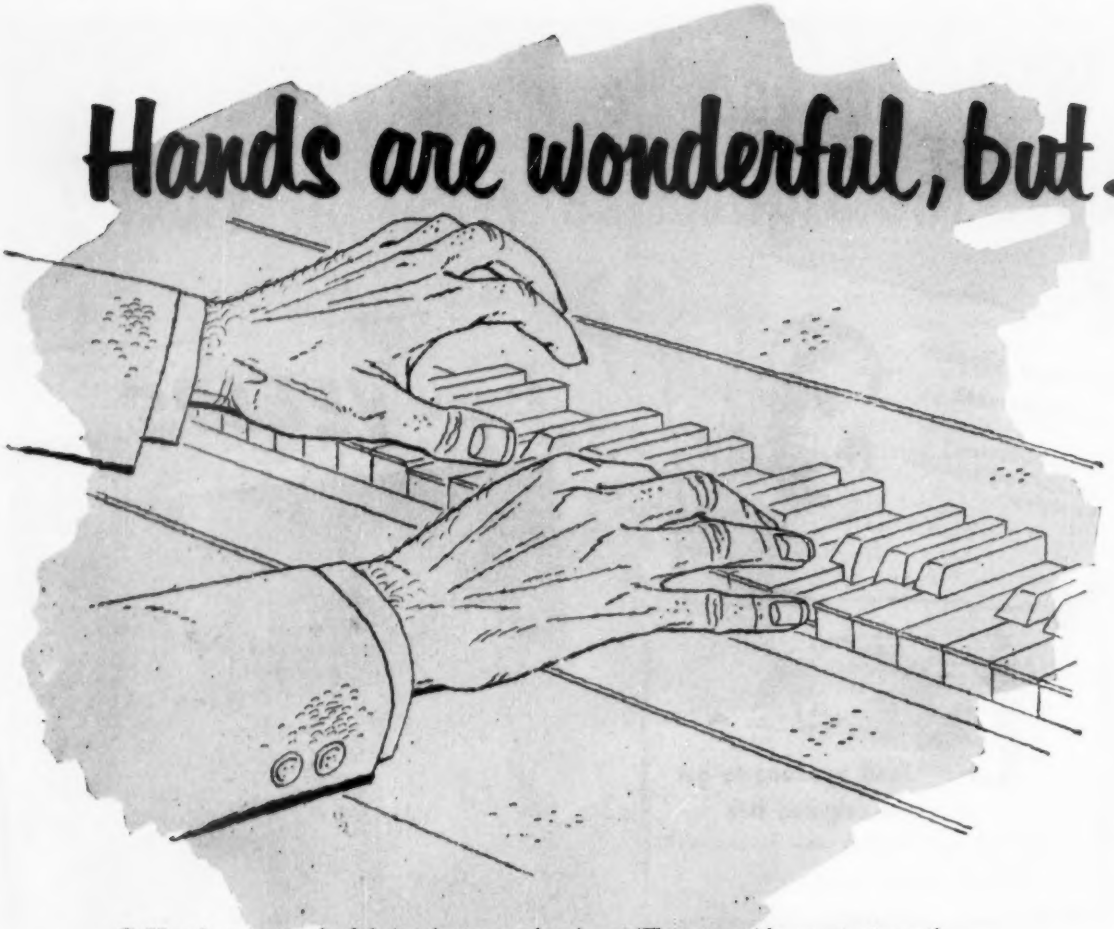


VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH · ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

Hands are wonderful, but...



● Hands are wonderful, intricate mechanisms. They provide great strength for the workman and the athlete . . . life-saving sensitivity and skill for the scientist and the surgeon . . . nimble precision for the musician and the artist . . . and commonplace but vital performances for everyone.

But . . . hands are the world's most inefficient mechanism for handling bulk materials!

Among the modern, automatic methods developed for transporting and handling bulk materials, Dracco Airstream Conveyors rate as one of the best. If you move large quantities of bulk materials investigate the many cost-saving advantages produced by "Performance Proved" Dracco Airstream conveying systems. The full story of the economies and advantages of the Dracco Airstream technique is presented in Dracco Bulletin 529 which will be sent to you on request.

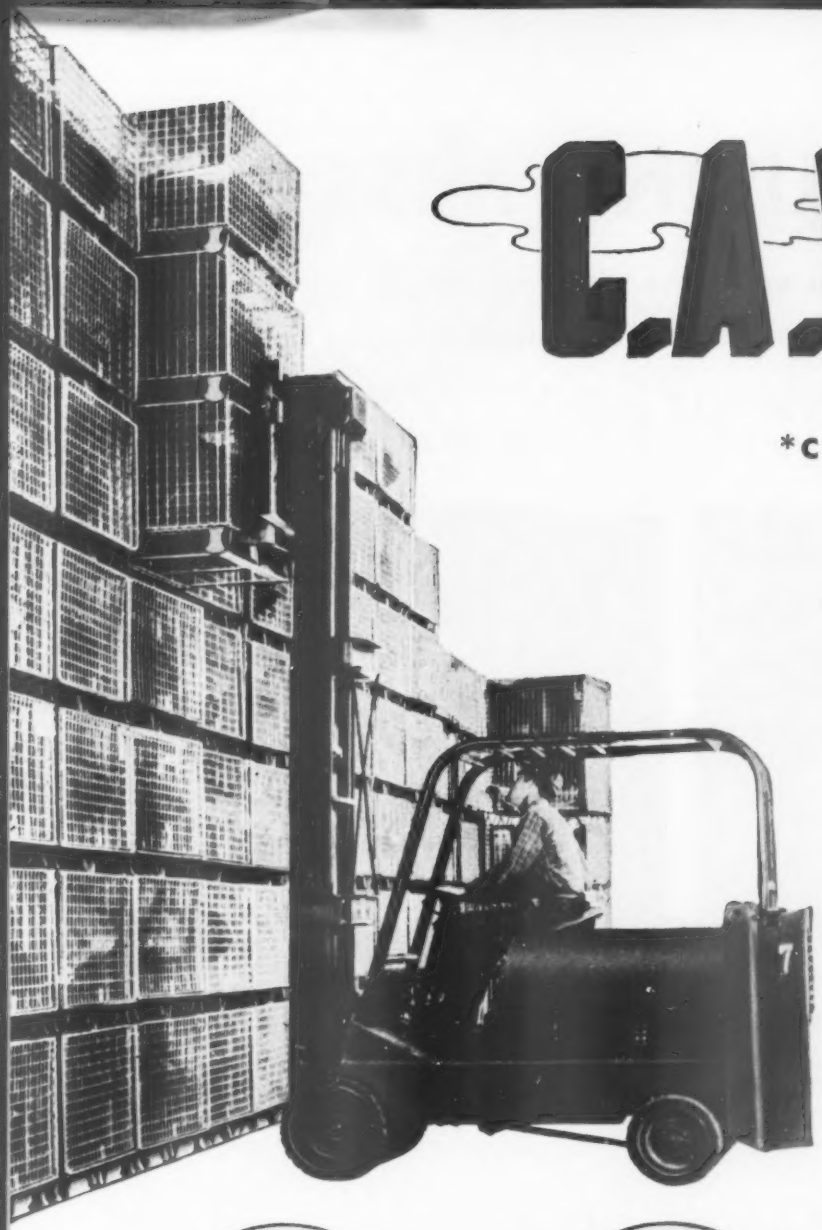
DRACCO CORPORATION, 4075 East 116th Street, Cleveland 5, Ohio.

DRACCO *Performance Proved*

Airstream **CONVEYORS · DUST CONTROL EQUIPMENT**

C.A.V.U.*

*CEILING AND VISIBILITY UNLIMITED!

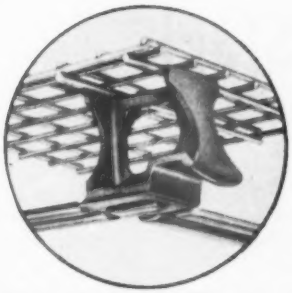


Think of it! Layer upon layer upon layer of rugged, lightweight storage units . . . each with contents visible, identifiable at a glance!

With USP Palletainers you *can* literally "stack to the rafters." New malleable iron legs permit 8-way entry for truck forks; assure solid, totter-free grip on unit below. Because contents are always visible you don't spend inventory time climbing ladders. Special "Warehouse Palletainer" has hinged front, can be emptied while at bottom of stack!

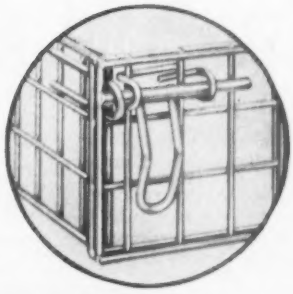
Palletainers cut your shipping costs, too. The virtually indestructible reinforced steel rod construction eliminates all damage in transit under normal conditions. Light weight of unit holds freight costs 'way down and empty Palletainers fold to ¼ space for return trip.

For full information on Palletainers, including names and locations of current users, or for free consultation on Palletainer applications in your plant, write, wire or call today.



NEW *malleable cast legs*

Design offers even greater unit capacities, faster stacking plus a higher margin of safety. New leg design incorporates a wider throat to simplify alignment and stacking with lift truck. Legs are welded to bottom mesh and formed-steel bearing plates to form a supporting section that is practically indestructible.



NEW *locking device*

Holds Palletainer sides securely, *regardless of load*. Cannot be released accidentally, cannot be lost in shipment. Made of heavy formed-steel rod and conveniently located for fast, safe and simple release. Empty Palletainers can be folded *flat* for space savings and lower return shipment rates.

UNION STEEL PRODUCTS CO.
Albion, Michigan

PALLETAINERS

1903 *Our Golden Anniversary* 1953

YOU MUSTN'T MISS—

INDUSTRIAL NEWS

INDUSTRIAL NEWS, BEGINNING ON THIS PAGE

TIMELY HINTS TO BETTER MANAGEMENT ON PAGE 296

QUOTES FROM INDUSTRY'S LEADERS ON PAGE 304

IDEAS TO STIMULATE YOUR THINKING, ON EVERY PAGE

CONVAIR CAMERAMEN SHOOT SCENES FROM CRANE.

SOUND IS ADDED BY EXECUTIVE BEFORE SHOWING.

Four Ways to Use Plant Newsreels

"Home-made" newsreels are effective tools in increasing production efficiency for Convair's San Diego division.

Scenes shot from advantageous plant locations, narrated by company executives, and shown within a few hours to engineers, superintendents, and foremen have helped the company:

- **Analyze changes in plant operations.** Convair took before-and-after pictures of hot-forming operations on drop hammers. The films made it possible to show production supervisors the advantages of the new methods without the delay involved in conducting a group into the work area.
- **Study plant layout progress.** Movies serve as a live report. Convair says the method is far more effective than explaining by drawings or statistics.
- **Improve safety and housekeeping.** Footage of various departments made during working hours has uncovered some unsafe practices that had previously escaped attention.
- **Focus attention on work methods.** Films have shown when workers were holding parts that should have been held in fixtures. They've also revealed crowded work stations and congested transportation facilities.

And that's not all. Convair reports the films have been useful in understanding morale of employees. Also, they have helped the company community relations program. *Turn the page*

Speed Nut
SAVINGS STORIES

Jackson TELEVISION

Channels 63% Savings

WITH TINNERMAN SPEED NUTS®

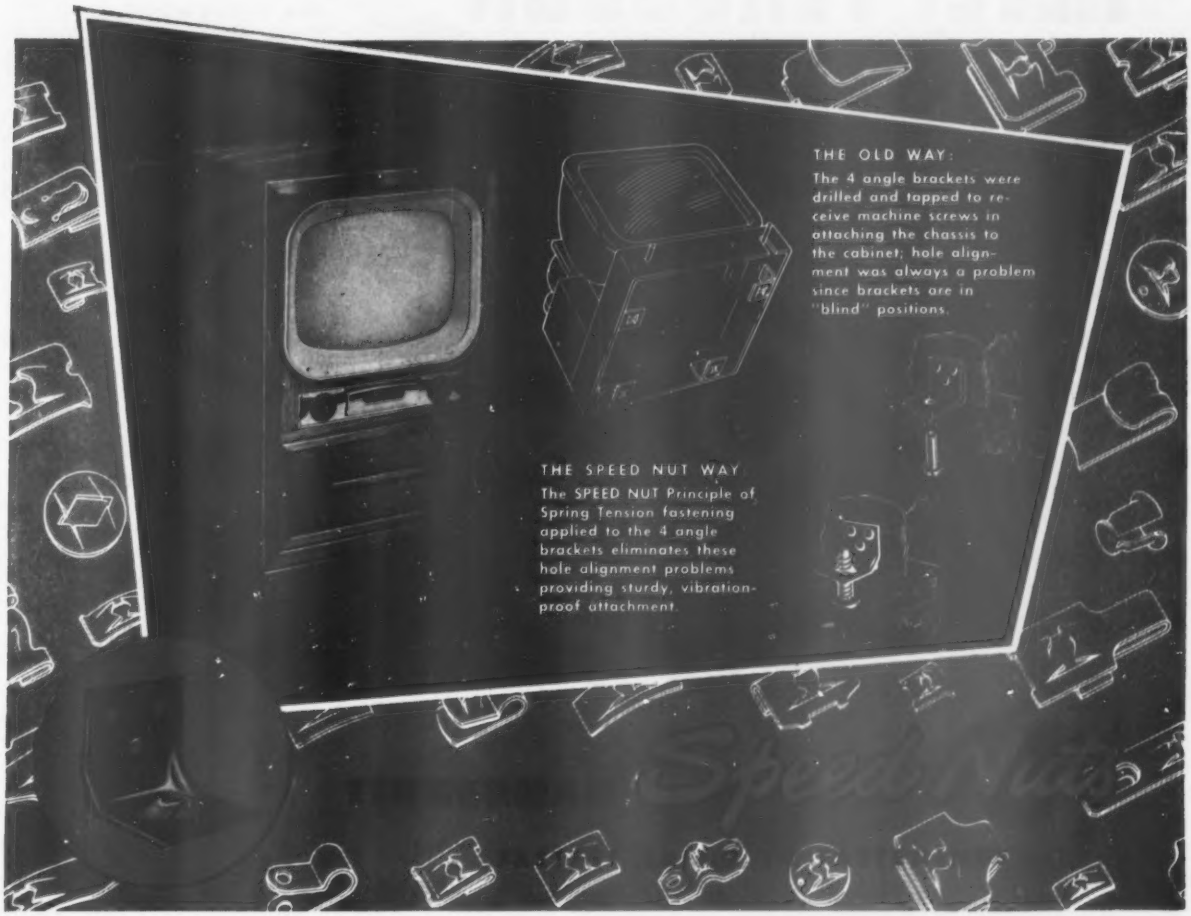
● Engineers at Jackson Industries, Inc., Chicago, Ill. are "on the beam" when it comes to maintaining TV quality at production line speeds. They found the SPEED NUT way of attaching their new Tri-Lok television chassis to the cabinet picked up a neat 63% production savings! This attachment was one of their toughest fastening problems... to solve it Jackson found a standard Tinnerman part tailor-made and engineered for the job!

Four angle brackets are used to fasten the chassis to the cabinet. In the old way, an angle bracket was threaded to receive a machine screw, and it was necessary to align the screws perfectly with the threaded holes since the attachment is in a "blind" position.

SPEED NUTS eliminate the tapping operation required in threading the angle brackets, making hole alignment easier, faster! Now Jackson has adapted this part into their standards along with a 63% savings in time and materials-handling!

You can turn your fastening problems into production savings... do as thousands of manufacturers are doing ...turn to Tinnerman for a FREE FASTENING ANALYSIS of your products. The Tinnerman representative in your area will be happy to give you the full details on this great service. Call on him today or write direct to: TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio.

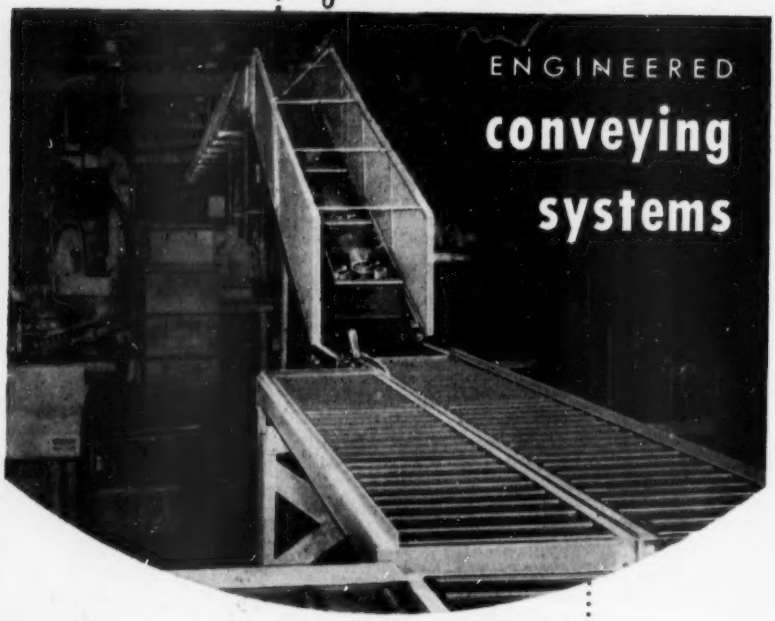
In Canada: Dominion Fasteners Ltd., Hamilton, Ontario. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *In France:* Aerocessoires Simmonds, S.A.—7 rue Henry Barbusse, Levallois (Seine.)


THE OLD WAY:
The 4 angle brackets were drilled and tapped to receive machine screws in attaching the chassis to the cabinet; hole alignment was always a problem since brackets are in "blind" positions.
THE SPEED NUT WAY
The SPEED NUT Principle of Spring Tension fastening applied to the 4 angle brackets eliminates these hole alignment problems providing sturdy, vibration-proof attachment.

ALL THE WORLD comes to Cincinnati for machine tools, pianos, radios, television sets, soap and conveying systems— A-F *Engineered* Completely Co-ordinated Conveying Systems.

ALVEY-FERGUSON

the original-Since 1901



For a discussion of latest efficient handling methods write:

THE ALVEY-FERGUSON COMPANY
132 Disney St., Cincinnati 9, Ohio

A-F CONVEYING MACHINERY

YOU can SEE the SUPERIORITY of ALVEY-FERGUSON Conveyor ENGINEERING

YOU MUSTN'T MISS—

Begins on page 282

CAMERAMAN CALLS the signals to truck operator as . . .

Fork Trucks Go Hollywood

If you decide to make movies around the plant, think about palletizing your cameraman.

You heard right. Pacific Intermountain Express found that a pallet on an electric fork lift truck made an ideal "dolly shot" platform for shooting many scenes in its new film, "Wheels of Progress."

Quiet operation, quickly adjustable height, maneuverability, and solid "platform" make the truck especially suitable for following action in picture taking.

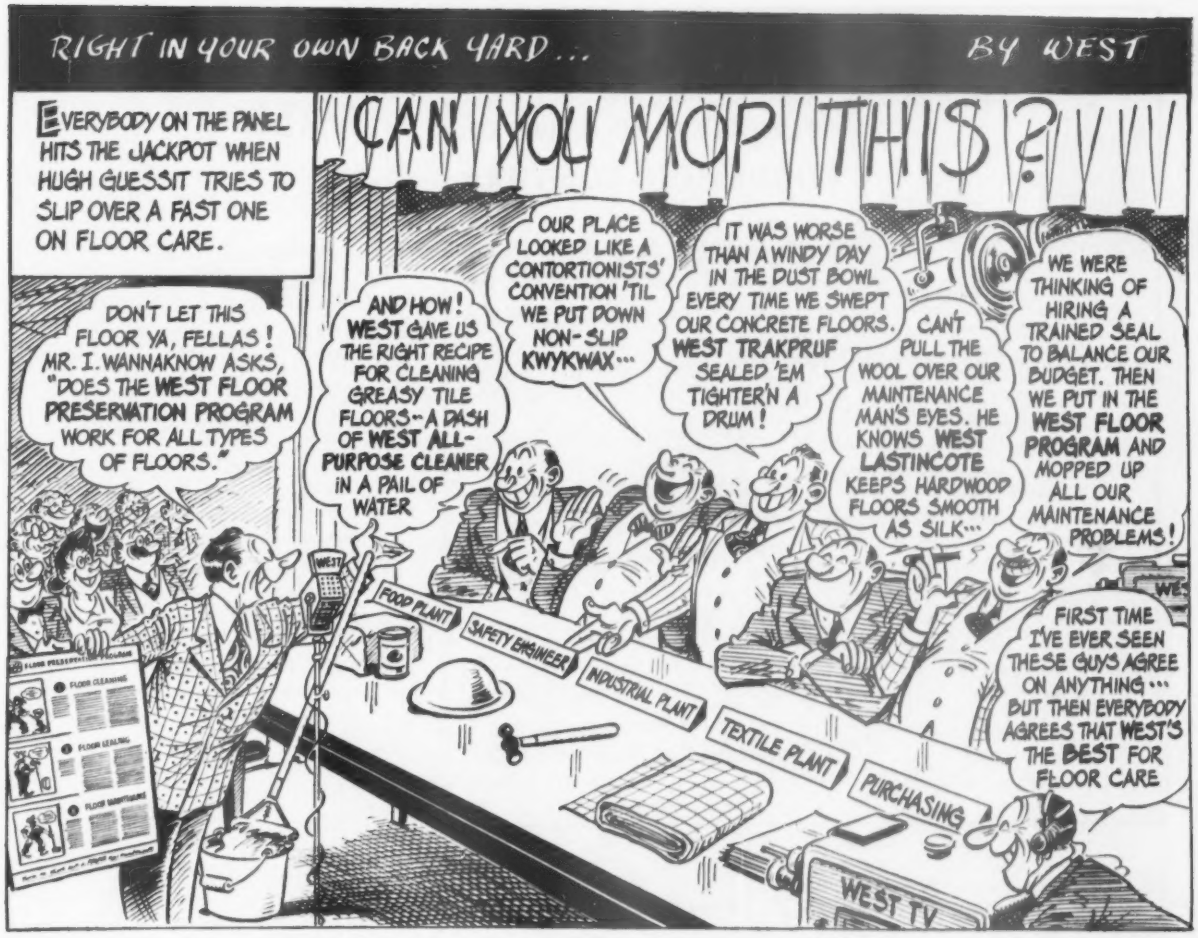
Transistors Now Used in Hearing Aids

Transistors — those minute specks of germanium that do the work of vacuum tubes—are being used in a consumer product for the first time.

Three manufacturers are replacing vacuum tubes with transistors in hearing aids. Results: A small-size high-powered instrument that operates at low cost.

The companies: Sonotone Corp., Elmsford, N. Y., Maico, Inc., Minneapolis, and E. A. Myers & Co., Inc., Pittsburgh.

Turn the page


RIGHT IN YOUR OWN BACK YARD...
BY WEST
EVERYBODY ON THE PANEL HITS THE JACKPOT WHEN HUGH GUESSIT TRIES TO SLIP OVER A FAST ONE ON FLOOR CARE.
CAN YOU MOP THIS$?
DON'T LET THIS FLOOR YA, FELLAS! MR. I. WANNAKNOW ASKS, "DOES THE WEST FLOOR PRESERVATION PROGRAM WORK FOR ALL TYPES OF FLOORS."
AND HOW! WEST GAVE US THE RIGHT RECIPE FOR CLEANING GREASY TILE FLOORS--A DASH OF WEST ALL-PURPOSE CLEANER IN A PAIL OF WATER
OUR PLACE LOOKED LIKE A CONTORTIONISTS' CONVENTION 'TIL WE PUT DOWN NON-SLIP KWYKWAX...
IT WAS WORSE THAN A WINDY DAY IN THE DUST BOWL EVERY TIME WE SWEPT OUR CONCRETE FLOORS. WEST TRAKPRUF SEALED 'EM TIGHTER'N A DRUM!
CAN'T PULL THE WOOL OVER OUR MAINTENANCE MAN'S EYES. HE KNOWS WEST LASTINCOTE KEEPS HARDWOOD FLOORS SMOOTH AS SILK...
WE WERE THINKING OF HIRING A TRAINED SEAL TO BALANCE OUR BUDGET. THEN WE PUT IN THE WEST FLOOR PROGRAM AND MOPPED UP ALL OUR MAINTENANCE PROBLEMS!
FIRST TIME I'VE EVER SEEN THESE GUYS AGREE ON ANYTHING... BUT THEN EVERYBODY AGREES THAT WEST'S THE BEST FOR FLOOR CARE
FOOD PLANT
SAFETY ENGINEER
INDUSTRIAL PLANT
TEXTILE PLANT
PURCHASING
WEST TV

New floors cost $300,000,000 *a year!*

TYPE OF FLOOR	INSTALLED COST* OF 50,000 SQ. FT.
Asphalt Tile	$15,000
Concrete	18,000
Linoleum	21,000
Hardwood	27,500
Cork	39,000
Rubber Tile	44,000
Vinyl Tile	44,000
Ceramic Tile	65,000
Terrazzo & Mosaic	87,500
Marble	300,000

*Based on reports of reliable flooring contractors in urban areas.

How much will it cost you to replace worn-out floors today? The chart gives you some idea.

But, your floors *don't have* to wear out. They can be protected almost indefinitely.

How? With West's simple, proven FLOOR PRESERVATION PLAN. (1) *Cleaning* — remove all dirt without harming floors (2) *Sealing* — fill the pores. Provide a protective coating (3) *Maintaining* — put on a tough, anti-slip floor wax.

The West Plan offers you more than 20 proven products. A West Floor Specialist will be glad to help you select the program or product you need.

WEST DISINFECTING Company

42-16 West Street, Long Island City 1, N. Y.

Please send FREE booklet "Proper Care of Floors"

DEPT. 56

Name_____ Title_____

Company_____

Address_____

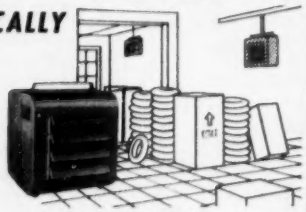
City_____ Zone____ State_____

COLD SPOTS
Converted TO AREAS OF PRODUCTION-COMFORT with
ELECTROMODE
All-Electric UNIT HEATERS

SUSPENSION TYPE MODELS available from 10 to 45,000 watts. Model 14-10 illustrated.

QUICKLY — EASILY — ECONOMICALLY

- Locate wherever heat is needed.
- No piping, flues or fuel storage required.
- Install and heat within one day.
- All current entering unit is converted into heat. No fuel loss en route.
- Models from 1500 to 45,000 watts to fit any heating need.



COMBINATION PORTABLE and suspension type models, 1500 to 7500 watts. Model AN-30A illustrated.

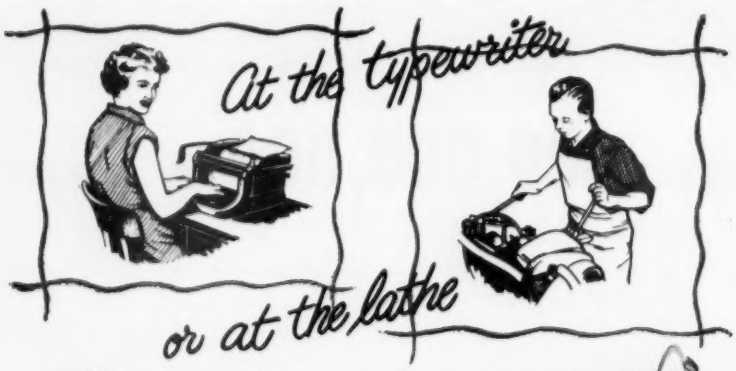
EXPLOSION-PROOF HEATERS for heating hazardous areas subject to explosion. In three sizes: 2000, 4000, 6000 watts. Model CX-2 illustrated.

Completely SAFE! Only Electromode has the cast-aluminum, sealed-in heating element and built-in safety switch. No danger of fire, shock or burn. No over-heating.

Approved by Underwriters' Laboratories

For complete information write:

ELECTROMODE CORPORATION
45 CROUCH ST. ROCHESTER 3, N. Y.
Leader in electric heaters since 1929



... all appreciate cool water

No matter where they work—in plant or office—you can save steps, reduce fatigue, keep production at the peak, with a dependable supply of cool water. Halsey Taylor fountains or coolers at strategic plant locations provide a welcome solution. Write for latest literature.

Halsey Taylor
COOLERS

SEE OUR CATALOG IN SWEET'S

THE HALSEY W. TAYLOR CO., WARREN, OHIO

YOU MUSTN'T MISS—

Begins on page 282

Industry Exaggerates Postwar Profits

A $38-billion overstatement in postwar profits has cost American industry some $17-billion in taxes and plenty more in bad public relations, says Machinery & Allied Products Institute.

Both inflation and unwise tax laws are to blame, according to *Capital Goods Review*, a MAPI publication. Here's the line of argument:

Industry's true profit over the past 7 years was $88-billion rather than the $126-billion it did show. Reason: Inflation has driven up costs of raw materials and equipment to the point where it costs far more to replace an item than it originally cost to buy it. So the higher cost of replacement should be allowed for as depreciation. And if it were, profits for tax purposes would be reduced to the lower figure quoted above.

Are profits too big? To clinch its point that real profits since 1946 have not been out of line, MAPI corrected postwar profits to allow for higher replacement costs. Then it compared postwar profits with profits of an earlier 7-year prosperity period — 1923-1929. Here are the results:

Profits expressed as a percentage of private national income or of sales. Corrected postwar profits are substantially below the averages of the corresponding percentages for 1923-1929.

Profits expressed as percentage of dividend payments to privately produced national income. Postwar payments have averaged 3.7% as compared to an average of 5.9% for the earlier base period.

Profits expressed as a percentage of corporate profits to net worth. Postwar profits: 5.9%; 1923-1929 profits: 5.8%.

Profits expressed in terms of constant (1950) dollars. Profits

Yes, even at the base of the clean, sharp threads of Sherarduct Rigid Steel Conduit you have full zinc protection. No need to worry about threads rusting even *before* you install it—not when you use SHERARDUCT!

The special sherardizing process of dry galvanizing permanently protects the conduit by actually alloying zinc to the steel walls. Both conduit and couplings have clean-cut, rust-proofed threads.

Pin hole rust spots can't form on the threads of Sherarduct—thus eliminating the one place most likely to endanger the life of a conduit system. When you use Sherarduct Rigid Steel Conduit, your job will withstand the test of time.

EVERYTHING IN WIRING POINTS TO

National Electric Products

PITTSBURGH, PA.

3 Plants • 7 Warehouses • 42 Sales Offices

FOR SKILLED PERFORMANCE BY UNSKILLED OPERATORS

INDOORS and OUTDOORS YOUR *BEST* PROTECTION FOR FLAMMABLE LIQUID, GAS AND ELECTRICAL FIRES

ANSUL DRY CHEMICAL FIRE EXTINGUISHING EQUIPMENT

Textile Lint Fires

Flammable Liquid Fires

Gas Fires

Electrical Fires

HAND PORTABLES
•
WHEELED PORTABLES
•
STATIONARY EXTINGUISHERS AND PIPED SYSTEMS
•
TRUCK MOUNTS, TRAILERS AND SELF-PROPELLED UNITS
•

Ansul Dry Chemical Fire Extinguishing Equipment has world-wide recognition as preferred protection for flammable liquid, gas and electrical hazards. Yet a surprising number of Ansul Extinguishers are used to protect textile mills and paper mills against serious loss from surface fires such as occur in textile lint and combustible paper dust.

The textile and paper making industries rely on Ansul Extinguishers for quick control of dangerous flash fires in class "A" (ordinary combustible) materials. Any remaining embers are quenched with small quantities of water, thereby keeping water damage at a minimum.

Surface fires in textile lint and combustible dusts spread rapidly. They need quick control. If you have serious lint or dust hazards, talk with your Ansul representative. He may have suggestions to reduce fire damage and lost production time.

ANSUL MODEL 20-B

Send for File No. 902. You will receive a variety of helpful printed matter. Included is our latest catalog which describes Ansul Extinguishers of all sizes — from the small Ansul Model 4 to Ansul Piped systems and Ansul 2000 lb. Stationary Units.

ANSUL CHEMICAL COMPANY
Fire Extinguisher Division
MARINETTE • WISCONSIN

OFFICES AND DISTRIBUTORS IN PRINCIPAL CITIES IN THE U. S. A., CANADA AND OTHER COUNTRIES
ALSO MANUFACTURERS OF INDUSTRIAL CHEMICALS, REFRIGERANTS AND REFRIGERATION PRODUCTS

YOU MUSTN'T MISS—

Begins on page 282

for the postwar period average are only moderately higher than the 1923-1929 level. And that's despite an increase of about 90% in the physical volume of private production since 1929.

Copies of *Capital Goods Review No. 12* are available from Machinery & Allied Products Institute, 120 S. LaSalle St., Chicago 3. Price: 25¢.

How to Build on Sand Without Piling

Now you can build your plant on dry wasteland sands—river-basins, shorelines, and deserts—with no support other than the sand itself.

The first large plant utilizing the Vibroflotation sand compaction process is scheduled to be completed early this year. It will save a quarter-million dollars over preparing the land with piling. Rust Engineering Co., Pittsburgh, is building the $12-million plant for International Minerals & Chemical Corp. at Bonnie, Fla.

The big problem • To construct a foundation that would support heavy structures and take shock and vibration without settling. Soil studies showed the site was underlain with an uncertain base of loose sand.

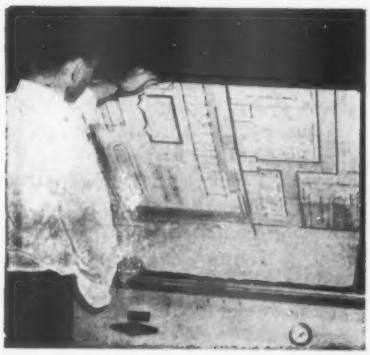
The solution • Engineers suggested Vibroflotation. A long tube, sunk to a depth of about 12 feet in the sand, vibrates with a force of 10 tons. This packs the sand into dense columns, about 13 feet deep and 8 to 10 feet in diameter. Column centers were sunk about 8 feet apart. This gave the area a relative soil density of 70% to 100%—more than adequate for high or very high bearing capacity, according to Rust.

Results • No measurable settlement after 6 months on one structure. Estimates had allowed for up to an inch on it.

Turn the page

1. YOU MAKE YOUR FLOOR PLAN by outlining permanent plant features with gummed tapes or inked lines on specially white-surfaced aluminum plates printed with a ¼" grid. These light, accurately squared, and easily handled plates can be butted together to represent any large area.

2. POSITIONING OF SCALED PLASTIC TEMPLATES and pre-printed tapes representing machine tools, conveyors, benches, aisles, etc. is the next step. You reproduce templates in multiples on sensitized plastic by photocopy from a drawn original. Double-sided adhesive tape allows movement of templates and rearrangement at any time.



3. NO COSTLY TRACING OR DRAFTING. As the layout progresses, you make photocopies of each completed plate quickly and easily on a Peerless vacuum-bed printer. From these, any number of vellum positive reproductions can be made in exactly the same way. Millwrights work directly from blueprints made from these copies when installing machines and equipment.

New Plant Layout Procedure Cuts Drafting Hours and Saves $$

PEERLESS PHOTOCOPY SYSTEM SLASHES LAYOUT PLANNING COSTS

NOW USED BY LEADING INDUSTRIAL CONCERNS. Originally developed by Industrial Photo Products Co. of Detroit, this modern plant layout system has been installed in many mass production plants in the automotive capitol.

It is now available on a national basis through Peerless Photo Products, Inc. and its distributors, who can supply all equipment and materials used in the procedure.

For complete and expert advice, please write us.

Send today for free MODERN PLANT LAYOUT leaflet.

PEERLESS PHOTO PRODUCTS, INC.

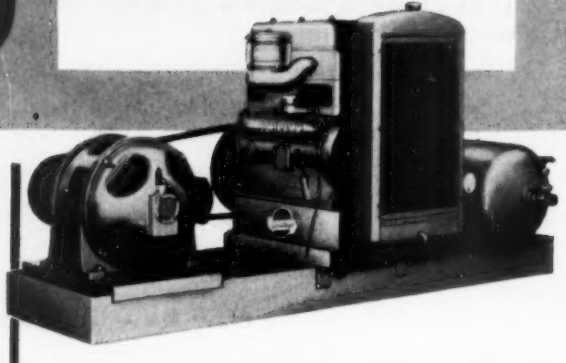
"Know-how in Photocopy"

PEERLESS PHOTO PRODUCTS, INC., SHOREHAM, L. I., NEW YORK

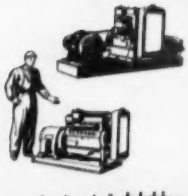
Distributors in: Los Angeles • Chicago • Cleveland • Detroit • Pittsburgh • Buffalo • Tulsa • Dallas • Houston • Salt Lake City • Atlanta

4. FOR CONFERENCE AND REFERENCE, Peerless layout plates are hung on walls or laid out on large tables so that engineers can view the whole plant area at once. When revisions are required, photocopy reproduction replaces slow, expensive drafting.

8 reasons why you save $$$$ when you buy a SCHRAMM AIR COMPRESSOR



"V" Belt Drive With Motor, Cooling Unit And Horizontal Air Receiver



Write for a free copy of Schramm Catalog 51 10A for information on the complete line of Schramm industrial compressors and accessories.

COMPLETE PACKAGE Easy to install and capable of furnishing 24 hour continuous service.

COMPACT Occupies only a fraction of the space required by other makes and designs of compressors.

UNIT SYSTEM You can install several Schramm Compressors, as your needs require, in a minimum of space.

EASY TO MOVE When your plant layout changes or you need an air compressor in another building.

ONE COST No expensive foundation necessary. Just install directly on any substantial floor.

VIBRATIONLESS Perfect balance of pistons and connection rods and vertical in-line construction, makes for vibrationless operation.

LOW MAINTENANCE Proper operating speeds . . . less horsepower required by compressor, cam operated mechanical intake valves provide greater volumetric efficiency.

LOW INITIAL COST Built in sizes ranging from ½ to 100 horsepower. Schramm ratings are given in actual air delivery at 100 p.s.i.g. and not piston displacement.

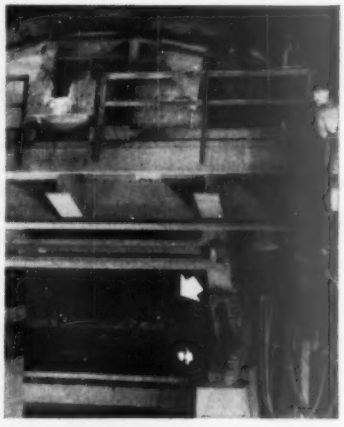
SCHRAMM, INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

YOU MUSTN'T MISS—

Begins on page 282



INDUCTION STIRRER, clinging to underside of Timken's 16-ton capacity arc furnace, gives . . .

Better Metal Mixing by Magnetic Force

Faster and more efficient molten metal mixing is the result of using magnetic force to stir an electric arc furnace.

Timken Roller Bearing Co., Canton, Ohio, says its induction stirrer not only cuts mixing time by 10% to 15%, but also:

- Gives increased output with more and larger heats.
- Improves steel quality.
- Controls temperatures more closely.
- Speeds sampling for metal analysis.

How it works. An induction coil in the stirrer sets up a magnetic field within the furnace. When the power is turned on, the molten metal moves in the magnetic field, mixing and stirring as it does so.

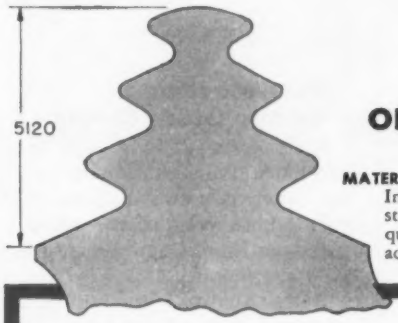
The technique is being used on electric arc furnaces of many sizes, from the relatively small ones in Europe to Timken's 80-ton giant. The stirrer alone cost $200,000.

It's an invention of Electric Co. Asea of Sweden, and is patented here. Aros Electric, Inc., New York, is the U. S. subsidiary.

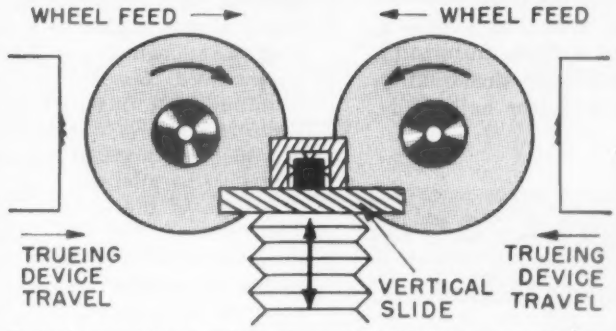
Turn the page

FORM GRINDING JET ENGINE BUCKET ROOTS FROM THE SOLID!

ON J & L DUAL-WHEEL AUTOMATIC FORM GRINDERS



MATERIAL BORDERS ON UNMACHINABLE Intense heat and great centrifugal stresses on the pressure surfaces require the toughest material and most accurate finish.



Bucket is mounted on a reciprocating vertical slide for two-way grinding.

AUTOMATICITY SPEEDS PRODUCTION — MAINTAINS REPETITIVE ACCURACY — Operation is simplified to the push button stage by a completely automatic work cycle.

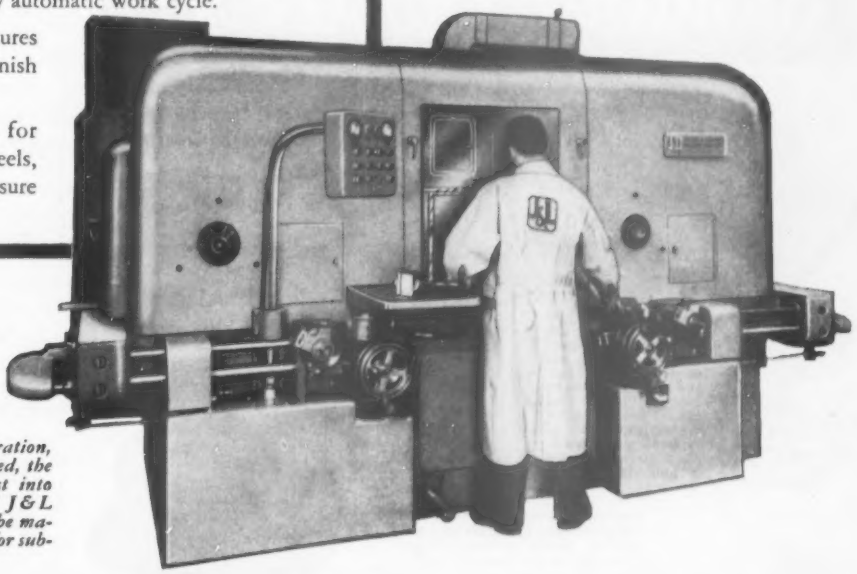
Automatic wheel trueing assures accuracy of form — includes finish trueing before final cut.

Automatic compensation for amount dressed off the wheels, and automatic wheel feed assure accurate sizing.

FEW MORE DIFFICULT GRINDING JOBS EXIST — Yet both sides of the root are ground simultaneously, to gage tolerances, on a production basis.

REPETITIVE ACCURACY MAINTAINED
Spacing of pressure surfaces within .0002
Taper within .0005
Angles within 10 minutes
Thickness from .0005 to .001

ACHIEVEMENT RESULT OF SEVERAL YEARS' RESEARCH AND EXPERIMENTATION — This application of the proven principles, long incorporated in J & L Thread Grinders, was initiated several years ago. The first machine was delivered in 1948. Continued study and subsequent refinements have helped lick one of the toughest machining problems of our day. Perhaps we can help you too.



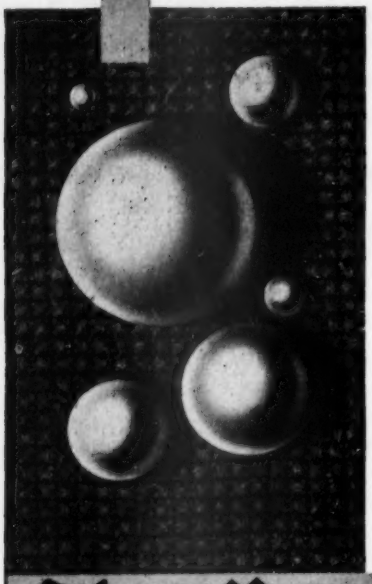
Before the grinding operation, the foil contour is checked, the blade oriented and cast into a matrix, on a special J & L Optical Comparator. The matrix serves as a fixture for subsequent operations.

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 505 Clinton St., Dept. 710, Springfield, Vt., U.S.A. THREAD GRINDER DIVISION

IN Size and Spherical Accuracy
Perfection of Surface
Uniformity—Dependable Physical Quality



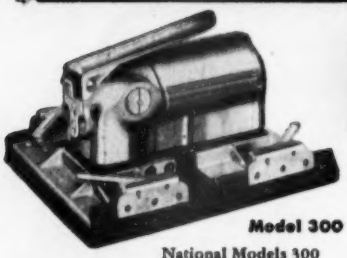
NOT A BETTER BALL MADE..

And the service results from every Strom metal ball prove it—not only in the finest precision ball bearings but also in the lot of other ball applications where Strom balls are doing the job better.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity, and dependable physical quality, there's not a better ball made.

Strom STEEL BALL CO.
1850 So. 54th. Ave., Cicero 50, Illinois
Largest Independent and Exclusive Metal Ball Manufacturer

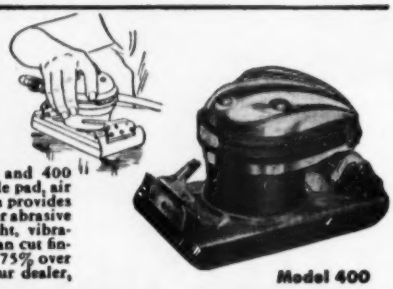
Sanding Problems?



Model 300

NATIONAL SANDERS
can speed production
in your finishing room

National Models 300 and 300A are straight line action, reciprocating, two-pad, air sanders. Felt, rubber, and neoprene pads in different sizes and shapes are available for various types of surfaces and materials. Water attachment is built in for wet sanding.



Model 400

National Models 100 and 400 are orbital action, single pad, air sanders. Orbital action provides faster cutting and longer abrasive life. These lightweight, vibrationless, fast sanders can cut finishing time as much as 75% over hand sanding. See your dealer, or write for details.

NATIONAL AIR SANDER, INC.
2816 AUBURN STREET, ROCKFORD, ILLINOIS

YOU MUSTN'T MISS—

Begins on page 282

New Machine Grinds Glass Better

Plate glass making will look lots more like a continuous process when a new machine that grinds both sides of the glass at the same time is spotted into the production line.

Better quality is the aim of the machine that smooths out the 900-ft. ribbon of glass as it comes from the annealing oven. Libbey-Owens-Ford Co., Toledo, now installing this machine in its Rossford plant, says it will make possible plate glass with a higher degree of parallelism. And simplification of the grinding operation should lead to cuts in manufacturing costs as well.

How it works. In the twin grinding process, the glass leaves the melting furnace and annealing oven as it used to do. But instead of being cut into sheets before grinding one side at a time, as is done now, the ribbon will continue straight through the twin grinder. There all irregularities will be smoothed off both surfaces. Then the glass will be cut to size and polished as usual.

L-O-F uses the process through a licensing agreement with Pilkington Bros., Ltd., the leading British flat glass manufacturer.

1952 Plant Outlays Were Record High

Manufacturing companies spent more for plant and equipment last year than ever before. The figure was $12.5-billion, up 12.5% over 1951. In contrast, all business and industry spent only 2% more in 1952 than it did in 1951.

The information appeared in the annual joint report by Securities & Exchange Commission and the Department of Commerce.

Turn the page

AIR CONTROL STARTS WITH SCHRADER VALVES

To use work ejection . . . clamping . . . and the numerous pneumatic sequence controls that work wonders in the average plant, you need reliable valves.

That's where Schrader Valves come in. Whether your air equipment is actuated by hand, foot, cam or tripper, you'll find a Schrader engineered valve that exactly fits your needs.

With over a hundred different models to choose from . . . each functionally designed to cover a broad range of applications . . . you'll have no trouble finding just the valve you need —one that is compact, easy to install, simple to maintain.

Each Schrader Valve is individually tested to full pressure rating before it is shipped. That's why you're sure of reliable service from every valve that bears the Schrader name.

Whatever your production scheme, it's likely you use air as a tool. And wherever you use air, there's a chance to make its use more effective with valves you can count on—Schrader Valves.

To see how truly practical Schrader Valves are . . . how you can't help but benefit from their use, write, describing your compressed air requirements —or fill out the coupon below.

Schrader
REG. U. S. PAT. OFF.

products
control the air

Air Cylinders • Operating Valves • Press & Shear Controls • Air Ejection Sets • Blow Guns • Air Line Couplers • Air Hose & Fittings • Hose Reels • Pressure Regulators & Oilers • Air Strainers • Hydraulic Gauges • Uniflare Tube Fittings

Mail This Coupon Today

A. SCHRADER'S SON
Division of Scovill Manufacturing Company, Incorporated
457 Vanderbilt Avenue, Brooklyn 38, N. Y., Dept. N-4

I am interested in more information on.....

Name_____ Title_____

Company_____

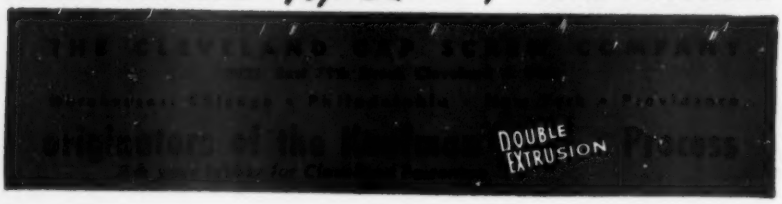
Address_____

Cap Screws: All standard heads—Hexagon (bright and high carbon heat treated)—Flat—Fillister—Socket (plain and knurled and flat heads)—Special. Extra large sizes—extra and special lengths—special materials.

Set Screws:
Square Head Cup Point in an unusually wide range of sizes. Other points available.
Milled Studs:
All standard sizes through 1¼" diameter. Also special sizes and threads.

Your own design parts—cold headed or single or double extruded, accurate as to dimensional detail, heat treated as required. Send blue prints and specifications to our factory.

CLEVELAND *Top Quality* FASTENERS



YOU MUSTN'T MISS—

Begins on page 282

Tomorrow's Big 10 of Industry

Will yours be one of the 10 greatest fields of opportunity once the defense program has passed its peak?

Here is a prediction of what those fields will be, courtesy of *York Report*, a newsletter published by York Engineering & Construction Co. and York-Gillespie Mfg. Co., Pittsburgh:

1. Fuel from atomic energy.
2. Electronic brains.
3. Pushbutton factories.
4. The engineered home.
5. Television advances.
6. The small car.
7. New metal processes.
8. Advances in rare earths.
9. Antibiotics, farm chemicals.
10. Better plastics.

Atoms to Fill Low Power Needs

Atomic energy will power your fork truck in the future.

That was the prediction of B. I. Ulinski, director of engineering, Automatic Transportation Co., Chicago.

Radioactive materials properly positioned and insulated in a vacuum tube build up high voltages, he explained. And the electric power tapped from such a unit, through only about a watt, will be useful for light power needs.

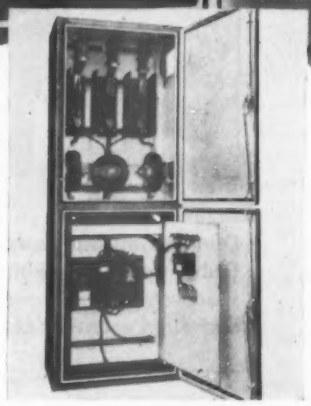
Steelmakers Sponsor Tin Can Research

The steel industry is again looking for a cheap way to reclaim tin and scrap from tin cans. American Iron & Steel Institute estimates it can recover up to a million tons of scrap a year from rubbish dumps of large cities if the research is successful. Both Armour Research Foundation and New York University will participate in the steelmaker-sponsored program.

Turn the page

choose EC&M

FOR 2300-4600 VOLT MOTORS



Two views of a 2300 volt EC&M VALIMITOR aligning-type cubicle starter with self-contained bus at top for connecting power to all the starters for this installation. Door interlock provides "*safety*" against opening disconnect switches under load.

OVERLOAD & SHORT CIRCUIT PROTECTION in a *single* unit

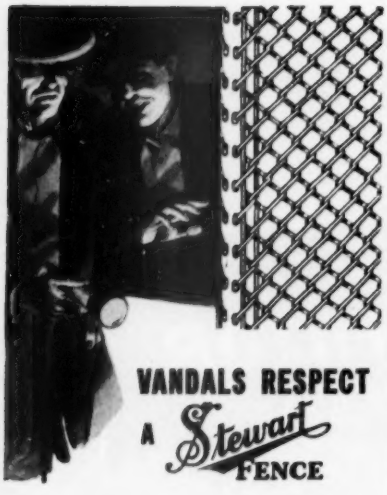
2-WAY PROTECTION with new EC&M Bulletin 1180-3 THERMAL-MAGNETIC Overload Relays. Instantaneous trip *magnetically* on short circuits... inverse-time trip *thermally* on overloads. Independent snap-action silver contacts for instantaneous and thermal trips help locate trouble when a shutdown occurs.

CONTINUOUS PROTECTION without blind spots is an inherent feature of EC&M VALIMITOR Starters, because the maximum fault current (KVA capability may be infinite) is limited to 25,000 KVA (steady state current) by EC&M VALIMITOR coils. Interruption of the current is by the well-known high interrupting capacity Type ZHS Contactor. No fuses to replace.

UNDER VOLTAGE PROTECTION—When voltage dips or power fails momentarily, motor will re-accelerate if normal voltage returns in two seconds or less. The contactor remains closed down to a low voltage with full spring pressure on the contacts. At about 25% control voltage, the contacts break cleanly—do not stick or burn.

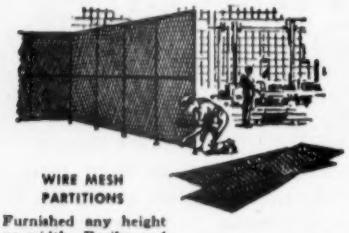
WRITE FOR T9-117 REPRINT BULLETIN

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO



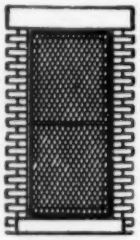
VANDALS RESPECT A Stewart FENCE

Every foot of unfenced property lines, every unprotected door, every window within reach of the ground, and skylights, too . . . all are potential points of entry. So why risk a visit from vandals or saboteurs? Surround your property with a Stewart Chain Link Wire Fence, and install the other Stewart products, some of which are illustrated below, designed specifically for protection against unwarranted trespass. Taking these precautions may prove the best investment you ever made. Write for catalog No. 85.



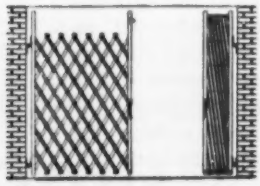
WIRE MESH PARTITIONS

Furnished any height or width. Easily and quickly erected. When writing for prices, please give all measurements involved.



WINDOW GUARDS (Wire or Iron)

Made with round or channel frames to fit any size or shape opening. When requesting prices, please give measurements and send diagrammatic sketch.



STEEL FOLDING GATES

Made in single or double gate construction to fit any width opening. Prices on request. Please give width and height of opening.

THE STEWART IRON WORKS CO., INC.
2056 Stewart Block Cincinnati 1, Ohio
Experts in Metal Fabrications Since 1886

Stewart IRON and WIRE FENCES

YOU MUSTN'T MISS—

Begins on page 282

TIMELY HINTS

Industrial Truck Fires And How to Stop Them

More than half the 268 industrial truck fires reported during a 10-year period occurred during fueling. Most could easily have been prevented if these simple rules had been followed: Refuel outdoors, if possible, away from storage or manufacturing areas; shut off engine during fueling operation: avoid spilling fuel: and carry a fire extinguisher—even if the truck's battery-operated.

The information is from a booklet on industrial loss prevention offered by Associated Factory Mutual Fire Insurance Companies. You can get a copy from the Engineering Div. at 184 High St., Boston 10.

Five Causes of Industrial Peace

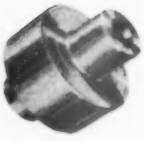
How do you keep peace between labor and management? There's no formula, but there are some guiding principles. National Planning Assn., Washington 6, made case studies of 10 plants with good labor relations, found these points in common:

1. Management fully accepts the collective bargaining process and unionism as an institution.
2. Union fully accepts private ownership and operation of the industry. It recognizes that union welfare depends on successful operation of the business.
3. The union is strong, responsible, and democratic.
4. The company stays out of the union's internal affairs.
5. Mutual trust and confidence exist between the parties.

Turn the page

Specify CENTRIC CLUTCH COUPLING for...

Centrics are the only Clutch-Couplings with shoe arrangements for controlled acceleration.



MOTOR TYPE CENTRICS—Available from fractional to 2500 H.P. have two sets of shoes (outer and inner) for perfect drive control.

DUAL TYPE CENTRICS, with predetermined engagement permit independent operation of either side of a dual drive arrangement—working on a spring controlled shoe principle. Available in a full range of capacities . . . fractional to 2500 H.P. inclusive.

Get the complete story about Centrics
We invite your inquiry

2239
CENTRIC CLUTCH COMPANY
P. O. Box 175
Main St. & State Route 35
Woodbridge, New Jersey

an ACCO product

Army Type WRIGHT SAFEWAY

● A steel hand hoist with compact, adjustable suspension and trolley to fit various width I-beams. Designed for low overhead. Easily converted to 2-wheel geared trolley unit.

Longer-life features include: steel in all load-supporting parts, load sheaves with five formed pockets, automatic load chain lubricator, alloy steel load chain, swiveling drop-forged load hook; alloy steel, machine-cut gears; fully enclosed, self-oiling gear case.

See your WRIGHT distributor or write for Bulletin **DH-269**.

2-wheel GEARED TROLLEY ASSEMBLY

WRIGHT Hoists Trolleys Cranes

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

WRIGHT HOIST DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Canada: UPTON, BRADEEN & JAMES LTD.
Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Vancouver

You simply can't beat this new

RIGID

Spiral for smooth easy reaming

★ This new improved Spiral reams burr from pipe as fast and cleanly as if it were wax . . . and makes quick work of enlarging conduit box outlets or cutting holes in sheet metal—and does it without chatter.

★ Improved ratchet handle—cutting edges of heat-treated tool steel for long service. You can't beat it for performance. Buy at your Supply House.

Remember also RIGID LonGrip Reamer with extra-long taper.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIGID

Work-Saver Pipe Tools

YOU MUSTN'T MISS—

Begins on page 282

How to Utilize Shutdown Time

Plant shutdowns forced by outside factors needn't be total losses. De Soto Division of Chrysler Corp., Detroit, used last summer's steel strike downtime to lick two problems:

Production changeover. A "dress rehearsal" of the big changeover required for the restyled 1953 automobile gave the company a chance to iron out wrinkles in processes before they could hold up production. Result: When steel became available, peak production on 1953 models was reached in only a fraction of the time usually required.

Production supervisors, maintenance men, electricians, millwrights, tool and die makers, and engineers took part in the dress rehearsal.

Taking annual inventory. The forced shutdown period offered De Soto an excellent chance to take stock. All company plants took advantage of it.

Palletized Loads Pay Off in Shipping

You get big dividends when you ship palletized unit loads of hard-to-handle items (FACTORY, August 1952, p. 134). So Dow Chemical Co., Midland, Mich., now palletizes all shipments of its magnesium alloy ingot. No extra charge to customers, either.

Advantages. There's less handling on both the shipper's and the user's end. Besides, palletization of the ingots helps maintain separation of batches in shipping, unloading, and within the company's plant.

Plants not equipped for mechanical unloading can handle the ingots in their usual manner after cutting the straps binding the pallet.

Turn the page

for new high precision gaging...

NEW No. 955 Electronic Caliper

Now you can measure work-in-process as closely as .00001" without removing the work from the machine or fixture, without lifting work from the bench. Apply the No. 955 Brown & Sharpe Electronic Caliper to the work and take your readings in units from .0001" to .00001" on the No. 950 Electronic Amplifier.

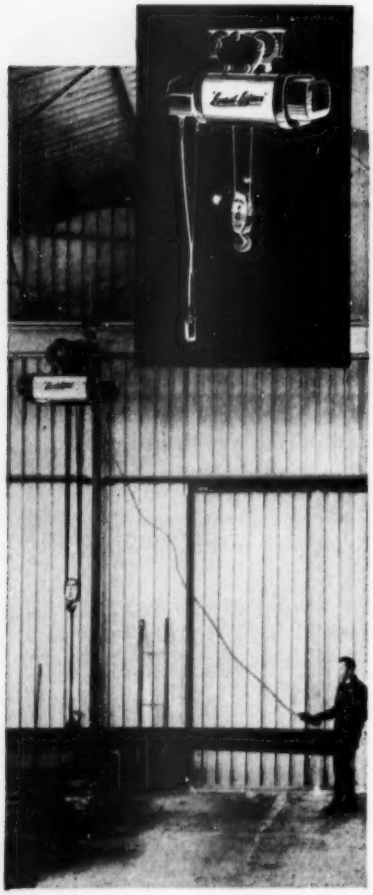
A measuring range from 0" to 4" is provided by four interchangeable jaws . . . only one master is required for any particular setting. For measuring long work pieces, an aligning attachment is available which provides a positive three-point bearing when caliper is applied to the work. A complete description of this precision caliper is given in the new Electronic Measuring Equipment Catalog. Write for it. Brown & Sharpe Mfg. Co., Providence 1, R. I.

Electronic Caliper with Aligning Attachment measuring long, slender work in grinding machine without disturbing work set-up.

WE URGE BUYING THROUGH THE DISTRIBUTOR

B·S

Brown & Sharpe



SHORT CUT TO MORE PRODUCTION

The "Series 700" 'Load Lifter' is the electric hoist for the job. It's fast — lifts a ton 30 feet a minute. It's easy to use. Push-button control eliminates muscle strain; the operator stays fit.

The 'Load Lifter' is tough, safe — has steel suspension; safety-type lower block and hook; motor and load brakes that require no attention; heat-treated helical gears; only 24 volts at the push button. Give your production a lift — at lower cost. Capacities: ½ ton and up. Write for 'Load Lifter' Bulletin 399.

MAXWELL MM MOORE

'Load Lifter' ®
ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, and 'American' Industrial Instruments.

YOU MUSTN'T MISS—

Begins on page 282

Want to Get More Out of Maintenance Dollars? Apply Methods and Measurement to Jobs

Apply industrial engineering techniques to maintenance with the same intensity as you apply them to production.

You've heard that before—sure. But this time the advice comes from a company that practices what it preaches. In several plants of E. I. du Pont de Nemours & Co., Inc., the techniques of methods and measurement have been used with considerable success in maintenance work. For each dollar du Pont spent in application of maintenance measurement it saved three maintenance dollars. And in many cases, the effectiveness of the maintenance department has doubled.

How does Du Pont do it? The report comes from F. F. Middleswart of Du Pont's engineering department:

- **Planning the job.** The foreman or a staff assistant looks at the job and determines work required. After preparing a list of materials and special tools needed, he outlines a step-by-step procedure for the most economical use of manpower and material. Also, he makes provision for safety devices and instructions.

Once methods have been established for repetitive jobs, the procedures can be filed and reused. But they should be reviewed periodically to bring tools and techniques up to date.

- **Work measurement.** From basic standard data, a time standard is given each job. Du Pont has determined the elements and time values applicable to each maintenance craft. They can be used by any plant, regardless of product.

When you have the basic data, you combine the elements into groups to fit each operation. This simplifies application of time standards.

- **Scheduling the job.** Important points to be set down in good scheduling are: type of mechanics needed; man-hours required for each craft; when job should be done; and maximum over-all time that can be taken for job.

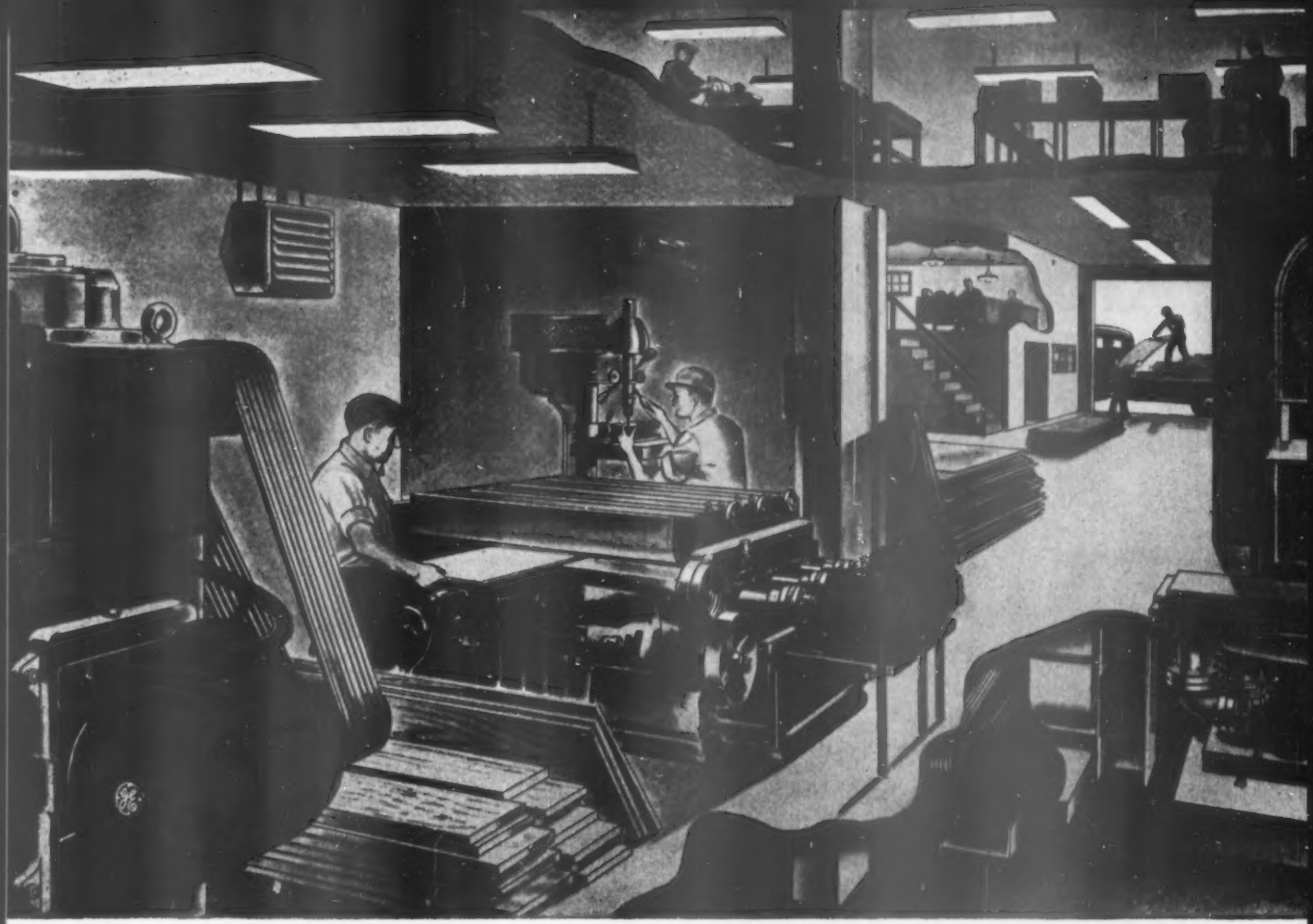
Du Pont uses a time card rack for the direct assignment of work to mechanics. One column of the rack is labeled for each man. In the space is inserted the jobs to be done, in proper sequence, and the time required for each. Total for each man should be more than 8 hours.

- **Control of material.** You keep adequate material stores, and establish the maximum amount of a given material that can be withdrawn from stores for a single repair order. Also, have material at the point of need at the right time. A material delivery system should be integrated with the maintenance schedule.
- **Control of tools.** A clear-cut policy should be established as to what tools the mechanic is expected to furnish for himself and what tools the company will provide. Also, you should maintain adequate inventory records of company tools, to insure having enough tools.
- **Preventive maintenance.** Statistical analysis techniques are important. Through their use, appropriate routine inspection cycles can be set, causes of failure assessed and controlled, and improved service rendered.
- **Maintenance cost analysis.** You want this for two reasons:

First, you can compare actual job time with estimated time. Where there is a big difference between the two, you can check to learn why.

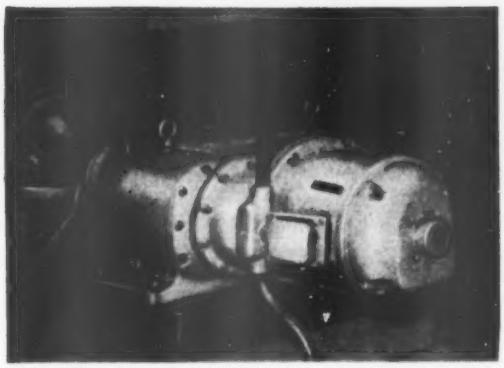
Second, you learn if repetitive repairs can be eliminated or cut down by use of better materials or improvement in design.

Turn the page



POWER—WHEN AND WHERE YOU NEED IT. Smooth, steady power for any production job begins when you install Graybar-distributed G-E motors and controls. AC or DC ... general- or special-purpose, G-E Tri-Clad motors offer you extra protection against physical damage, electrical breakdown, and operating wear. Given ordinary care, General Electric motors provide dependable service under even the toughest operating conditions.

This production team pays off in performance



MATCHING G-E MOTOR CONTROLS give full protection against injurious overloads ... provide maximum flexibility of motor operation. All live parts are completely enclosed, yet cases have ample conduit knock-outs and terminals for easy installation.

General Electric Tri-Clad motors and matching G-E controls make a hard-to-beat production team. You get reliable, uninterrupted performance shift-after-shift—a practical defense against downtime due to motor failure.

Graybar distributes the complete line of G-E motors and controls. Your local Graybar Representative can help you select the proper equipment for any machine-drive requirement...help you analyze special service conditions that demand totally-enclosed motors, variable speed motors, gear motors, or reversible motors.

Check with him, too, for details on the G-E Motor Exchange Plan. Covering popular fractional and integral ratings, this plan makes emergency replacement of inoperable motors a simple over-the-counter transaction.

Graybar can furnish you or your electrical contractor with practical advice on the installation and usage of over 100,000 different electrical items. For help in speeding lighting, communication, ventilation and wiring projects of all types, call our nearest office. *Graybar Electric Co., Inc. Executive Offices: Graybar Building, New York 17, N. Y.*

245-112

Call Graybar first for... Graybar Everything Electrical

IN OVER 100 PRINCIPAL CITIES

How Much Would it Cost You...

If This Happened to Your TURBINE

$50,000

● Replacement of turbines is costly . . . even in the case of minor repairs, labor, parts and downtime costs soon mount up. To go under the assumption that the installation of superheaters in a boiler eliminates the need for purifier protection is dangerous. Particularly during startup and periods of faulty boiler operation such as occurred above, all turbines should have Hi-eF Purifier protection. These high efficiency units assure you of the delivery of cleaner, drier steam of better than 99.95% quality.

Write, wire or phone today for information on protecting your steam-using equipment and boilers with Hi-eF Purifier.

ANDERSON Hi-eF PURIFIERS

WATCHDOGS OF STEAM • AIR • GAS • VAPOR Pipelines and Equipment

THE V. D. ANDERSON COMPANY

1997 W. 96th Street – Cleveland 2, Ohio

Please send information on the following types of purifiers:

☐ Line Type ☐ Internal ☐ Receiver

Name ..... Title .....

Address .....

City .....

State .....

BY THE MAKERS OF SUPER-SILVERTOP STEAM TRAPS

YOU MUSTN'T MISS—

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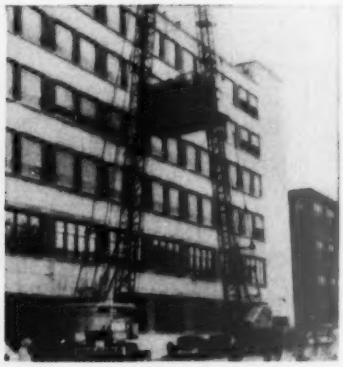


HOISTING A ROOM INTO PLACE.

Cranes Serve as Outside Elevator

You can install a unit fully assembled even if it's too big to fit your plant elevator. Use a crane to spot it in place from outside the building.

Eastman Kodak Co., Rochester, used two mobile cranes to do the job on an assembled test chamber measuring 10½ x 11½ x 20 feet. Top-floor construction was finished after the urgently needed chamber was installed.

Economic Education: Does It Really Work?

Who says economic education doesn't really educate?

Advertising Council, Inc., New York, divided 100 industrial workers into two equivalent groups of 50 workers each. One group had read the Council's economic education booklet, "The Miracle of America." The other hadn't. Then both groups were asked, "What do you think are the reasons for America's high and rising standard of living?" Here are a few of their answers:

Answers	Readers	Non-Readers
High productivity	36	10
New inventions, machines	66	14
More skilled workers	24	2
Free enterprise, competition	24	4

Turn the page

New G-E Rapid Start lamp needs no starter, cuts maintenance

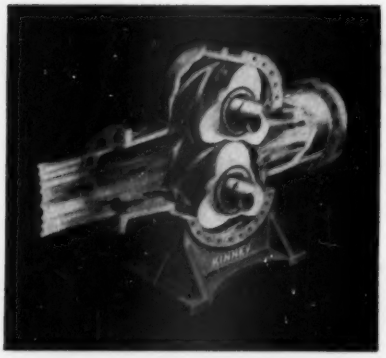
IN THE NEW RAPID START lamp circuit G-E has been able to eliminate the starter required in standard lamps to pre-heat the cathode. For that reason, maintenance is even easier, more economical than before.

This new General Electric *Rapid Start* lamp was made possible by two G-E developments: an improved triple-coil cathode that replaces the double coil in standard fluorescent lamps, and a *Rapid Start* ballast. Together, they give General Electric *Rapid Start* lamps almost instant starting and smooth, simple operation.

G-E *Rapid Start* fluorescent lamps are rapidly becoming available. Many leading fluorescent lighting fixture manufacturers are incorporating the new lamps and ballasts in their latest equipment. These two newest developments of G-E research are another reason why you can *expect* the best value from General Electric fluorescent lamps.

You can put your confidence in—

GENERAL ELECTRIC



GET THE PUMP THAT'S

BUILT FOR FUEL OIL TRANSFER

Look into a Kinney Model HQA Heliquad Rotary Pump and you'll see why so many process industries and power plants use this pump for fuel oil transfer. Everything about Kinney Model HQA is built for dependable and efficient performance: steep helical pumping rotors that deliver liquids smoothly and steadily, positive clearances within the pumping chamber to eliminate friction and wear, external heavy-duty anti-friction bearings and timing gears with separate lubricating system, rugged construction to reduce maintenance costs and insure smooth, continuous operation year after year.

Send coupon for complete information about Kinney Rotary Liquid Pumps — or ask to have our engineer call to discuss your pumping problems. Kinney Manufacturing Co., Boston 30, Mass. New York, Chicago, Detroit, Cleveland, Atlanta, Philadelphia, Pittsburgh, Johnstown (Pa.), Charleston (W. Va.), Los Angeles, Houston, New Orleans, San Francisco, Seattle, and foreign countries.

Kinney

KINNEY MANUFACTURING COMPANY
3624 Washington Street
Boston 30, Mass.

☐ Please send Bulletin L51 describing Kinney Liquid Pumps.
☐ Please have your representative call.

My pumping problem involves .....

NAME .....
COMPANY .....
ADDRESS .....

SUBSIDIARY OF THE NEW YORK AIR BRAKE CO.

YOU MUSTN'T MISS—

Begins on page 282

QUOTES

Donald F. Carpenter of Du Pont, telling how industry should conduct itself under the new administration in Washington:

"It is time for us to show our statesmanship. We must not change from the hunted animal to the devouring beast — but rather we must emerge from behind the tree confident that we will not be fired upon by the first government agency that spots us."

Lawrence A. Appley of American Management Assn., on the increasing interest in executive training:

"Management is going to school in increasingly large numbers . . .

"Apologies are no longer required. Neither does our approach have to be to sneak up on the blind side of individuals. Most of them want more knowledge, are looking for it, and are just waiting for the next level of management above them to give them the opportunity."

Don F. Copell of Wagner Baking Co., Newark, N. J., describing how management can take conditions as they are and make them work to advantage:

"(We must set the example of) cost-conscious deeds and daily effective and enthusiastic actions. You won't leave footprints in the sands of time or on the floor of your factory by sitting in your office. Economy and cost-consciousness . . . must trickle down from the top."

Turn the page

"RUBBER COAT"

Stops Moisture, Mold Attack on Mechanical Equipment

Developed for food, beverage and chemical processing machinery, bottle washers and other mechanical units operating under tough conditions! *Real* protection for mechanical equipment constantly exposed to the ravages of moisture, corrosion, mold and mildew. New Tropical heavy-duty Metakote rubber-base gloss enamel — formulated especially for industrial maintenance use — provides a tight, tough, rubber shield that defies attacks of moisture, will not support mold, withstands constant scrubbing, spilling, splashing.

WRITE! **Your business letterhead request brings all the facts on Metakote and other Tropical paints formulated for the toughest maintenance painting jobs. No obligation, write today!**

•

THE TROPICAL PAINT & OIL CO.
1122-1256 W. 70th, Cleveland 2, O.

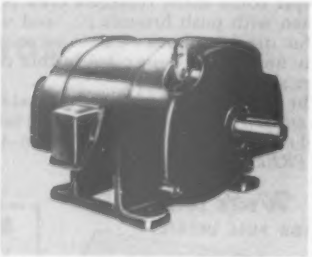
Heavy-Duty Maintenance Paints Since 1883

TROPICAL

Subsidiary of Parker Rust Proof Company

Horizontal C face mounting, frame with feet. As used on any close-coupled drive.

Type D flange mounting for vertical drive. Also available for horizontal application. Ideal for pump drives.



The splash-proof enclosure affords full protection against splashing liquids.

ELLIOTT Crocker-Wheeler

PROTECTED TYPE FORM BA MOTORS

● In addition to standard horizontal mounting, you can get this motor with Type C face mounting, horizontal or vertical. You can also get it in Type D flange mounting, horizontal or vertical, with or without feet.

The standard enclosure is open dripproof, with all openings below the centerline. Also available in splashproof enclosure, as illustrated below.

The basic motor has all the Crocker-Wheeler sturdiness of double-row-width bearings, prelubricated and sealed; Vinylastic-insulated coils, Alucast rotors and similar refinements. In NEMA frames 203 to 505 inclusive, and in ratings above. Write for the Form BA Bulletin.

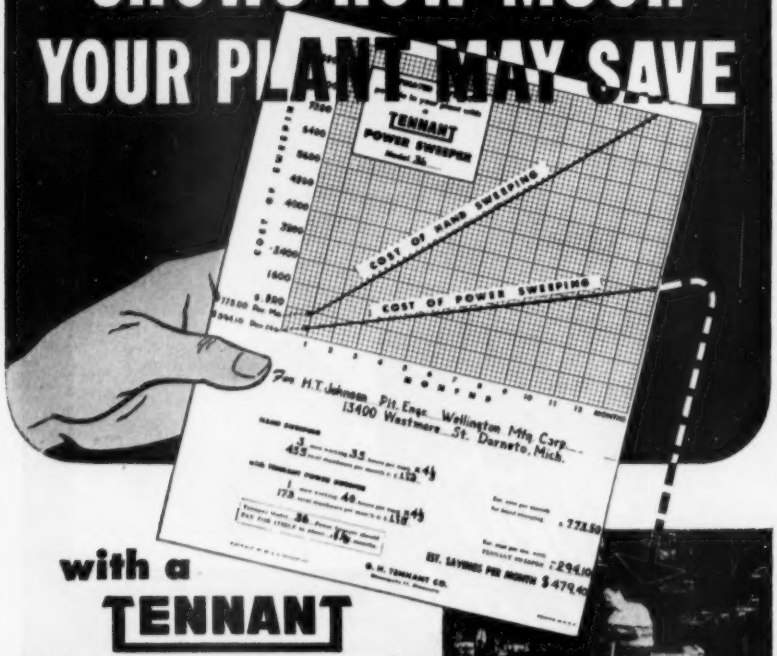
ELLIOTT Company

CROCKER-WHEELER DIVISION
AMPERE, N. J.

For large motors: RIDGWAY DIV., RIDGWAY, PA.
Plants at: JEANNETTE, PA. • RIDGWAY, PA. AMPERE, N. J. • SPRINGFIELD, O. • NEWARK, N. J.
DISTRICT OFFICES IN PRINCIPAL CITIES
ELLIOTT APPROVED SERVICE SHOPS COVER THE COUNTRY

Yours for the asking! Free, accurate graph . . .

SHOWS HOW MUCH YOUR PLANT MAY SAVE


TENNANT
POWER SWEEPER
COST OF HAND SWEEPING
COST OF POWER SWEEPING
From H.T. Johnson, Pit. Engr. Wellington Mfg. Corp.
13400 Westmere St. Detroit, Mich.

with a TENNANT POWER SWEEPER

How much do you actually pay for hand sweeping in your plant? And how much *could* a TENNANT Power Sweeper save you?

You'll get answers to these questions in a specially prepared *Cost-Savings Graph* like the one shown above.

It's a frank, conservative estimate of your plant's probable labor savings, based on a personal survey. It's attractive, carefully drawn, sensibly practical. And—it is *free;* no cost or obligation.

OFTEN REPLACES 3 to 12-MAN CREW

If yours is a typical plant, your graph will probably show that one TENNANT Power Sweeper could easily replace a crew of 3 to 12 men with push brooms . . . and would pay for itself in about 90 days or so. Most plants find their savings are in this range. Yours should be, too.

Why not get the facts in handy visual form? You *see*, month by month, the labor savings you'd make with a Tennant Sweeper. *Ask for your FREE GRAPH today.*

EXCLUSIVE FEATURES, such as instant reverse, automotive steering, make it easy to SAVE EXTRA TIME with a Tennant Sweeper. Gas or electric; various sizes.

HAS BIG SWEEPER CAPACITY but is small enough for narrow aisles. A NEW model; speed range 2-8 mph. Pays for itself fast.

Write today FOR FULL DETAILS

TENNANT Established 1870

G. H. TENNANT CO. 2554 N. 2nd Street Minneapolis 11, Minn.

Yes, without cost to us, please estimate our probable savings with a Tennant Sweeper; and send us free COST-SAVINGS GRAPH and details on ☐ Sweeper Bulletins; ☐ gas model; ☐ electric.

NAME_____

FIRM_____

ADDRESS_____

INDUSTRIAL FLOOR MACHINES

CREATORS OF THE TENNANT SYSTEM OF FLOOR MAINTENANCE—MANUFACTURERS OF EQUIPMENT AND MATERIALS FOR MAINTENANCE OF FLOORS, DECKS, ROOFS, HIGHWAYS.

Offices in Principal Cities

YOU MUSTN'T MISS—

Begins on page 282

Benjamin F. Fairless of U. S. Steel, before the christening of a new "Nancy" blast furnace at Fairless Works, Morrisville, Pa.:

"Among steel men, of course, a blast furnace is always known as a 'lady' and is named for one—not because the furnace is a thing of shapely beauty, exactly, but because it is inclined, at best, to be somewhat temperamental."

A. J. Grascia of Goodyear Atomic Corp., explaining why Goodyear Tire & Rubber Co. branched out into the atomic energy business:

"As an organization whose basic products tie in so closely with energy utilization we want to be in the vanguard of such a movement. We want to know what new design criteria may be established for our products — what changing applications are developing."

Conclusion of the New England Governors' Report on the Textile Industry, analyzing why New England has lost some textile business:

"New England virtues are good virtues. So were the virtues of the dinosaur . . . With the dinosaur, it was too much too long; with New England, too little too long.

"'Eat it up, wear it out, make it do, go without'; these are the classic virtues of New England. New England management in the twenties and thirties tended to eat up its profits, to wear out its equipment, to make its buildings do. to go without Federal cooperation. . . .

"Instead of recalling past glories, castigating past failures, and embracing future catastrophe, New England must meet this challenge of the present."

Dust, Grit, Fog or Fumes
CAN'T GET UNDER THE "SKIN"

of your Century

TOTALLY ENCLOSED FAN COOLED MOTORS

The inner frame of your Century TEFC Motor completely seals all the vital working parts against air-borne hazards. An effective stream of air blown between the inner and outer frames, keeps the motor temperature within safe limits at rated load.

Century TEFC motors operate your equipment efficiently in any kind of atmosphere — resist dusts, dirt, chemical or oil fog, and mists.

Whatever the job or working conditions, Century's wide line of types, sizes, and variety of operating characteristics, enables you to select the motor specifications for top equipment performance.

⅛ to 400 horsepower ratings — A.C. or D.C.— Furnished in Drip Proof — Splash Proof — Dust Proof — or Explosion Proof frames — for most all atmospheric surroundings.

Specify Century motors on your new equipment or replacements. Your nearby Century District Sales Office or Century Distributor will be glad to give you full information.

Century C MOTORS

CE-765

CENTURY ELECTRIC COMPANY • 1806 Pine Street, St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

IF YOU WANT YOUR
YARD OPERATIONS
SPEEDED UP—

HEAVY-DUTY
WAYNE CRANE
IS YOUR BEST BUY
BECAUSE...

10-Ton
Model 20
Wheel-Mounted

- IT TRAVELS
- IT SWINGS
- IT HOISTS
- IT BOOMS

either SIMULTANEOUSLY
or INDEPENDENTLY!

This means no stopping, clutching and shifting at each operation—saves time and excessive wear—results are more production, less costly downtime.

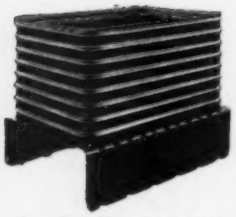
Wayne Crane Model 20 has three equal speeds forward and reverse—no turn-around problem.

A Wayne Crane dealer is located in every major industrial city. See him or write TODAY for specifications and prices. You'll like both!

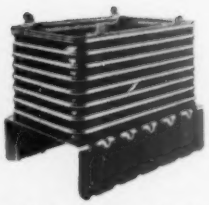
WAYNE CRANE
Heavy-Duty
INDUSTRIAL CRANES
8 to 12½-ton capacity

ALSO AVAILABLE
MODEL 40 12½-Ton Truck-Mounted
MODEL 66 8-Ton Crawler-Mounted

WAYNE CRANE DIVISION
AMERICAN STEEL DREDGE CO. INC.
FORT WAYNE 1, INDIANA

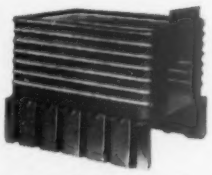


Type PB-120 steel box and skid platform unit.



Type PB-120T box and platform unit with tiering lugs.

Type P-1 skid platform in your choice of standard widths, lengths and clearance heights.



Type PB-650 box and platform units with sliding end door.

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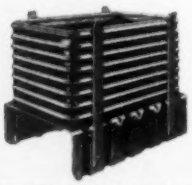
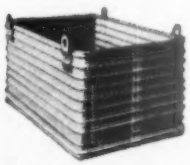
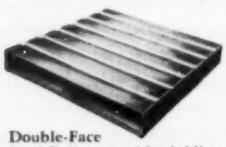


Type PB-120-L box and platform units with full length lifting lugs.



Type B-80C box units equipped for crane handling; corrugated bottom.



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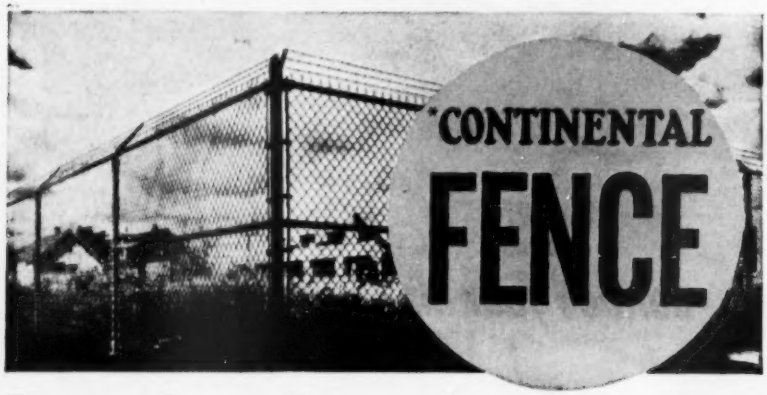

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What Workers Think About Merit Rating

By EUGENE J. BENGE,
Hu-Management Engineer,
Asheville, N. C.

In FACTORY, September 1952, Whiting Williams wrote an article entitled "Top Union Leaders Are Losing Touch with Rank and File" (page 91). This article started me thinking about a question on merit rating versus length of service that we have used repeatedly in employee attitude surveys. The answers provide dramatic support for Williams' point of view.

The question, presented as alternate choices, is:

a. I think promotion and pay increases should mainly be arrived at through my length of service with the company.

b. I think promotion and pay increases should be determined by individual merit rating based on my own performance on the job.

From our files we selected the first 25 companies that had put this question to their employees, and tabulated the numbers in favor of each alternative.

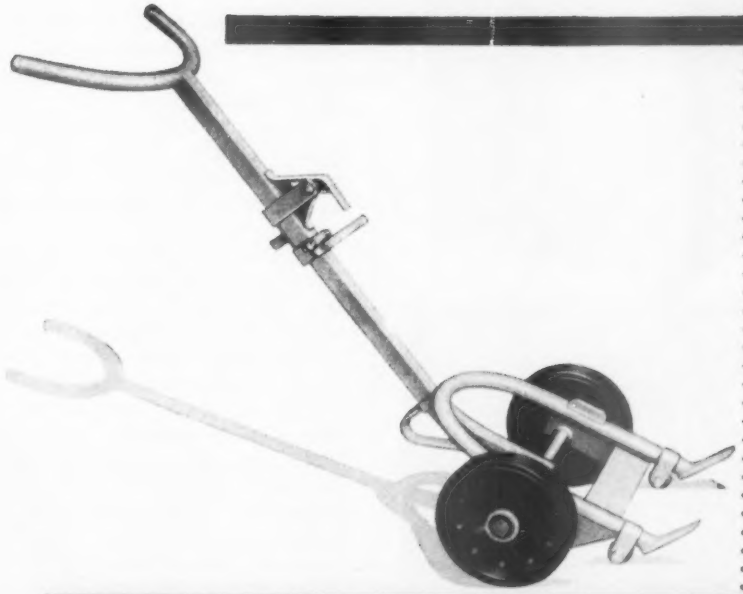
There were 10 unionized manufacturing plants, 12 non-unionized manufacturing plants, 2 financial companies, and 1 utility in our sample of 25. They were well scattered geographically, in 10 states. One was in Canada.

Here are the results of our study—amazing to us:

Turn the page

Multi-Purpose Colson TRUCKS

Save American Industry Time and Money



● The COLSON Universal Drum truck, shown here is the answer to fast, safe handling of drums and barrels. It locks any size container between the adjustable chimb hook and pick-up tips, lifts it easily and carries it with the weight evenly balanced over the wheels.

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Whether your materials-handling requirements are *standard* or *special* you can count on precision-built COLSON equipment to meet your requirements *exactly*. Write us or consult the yellow pages of your phone book (under "Casters" or "Trucks: Industrial") for the COLSON office near you.

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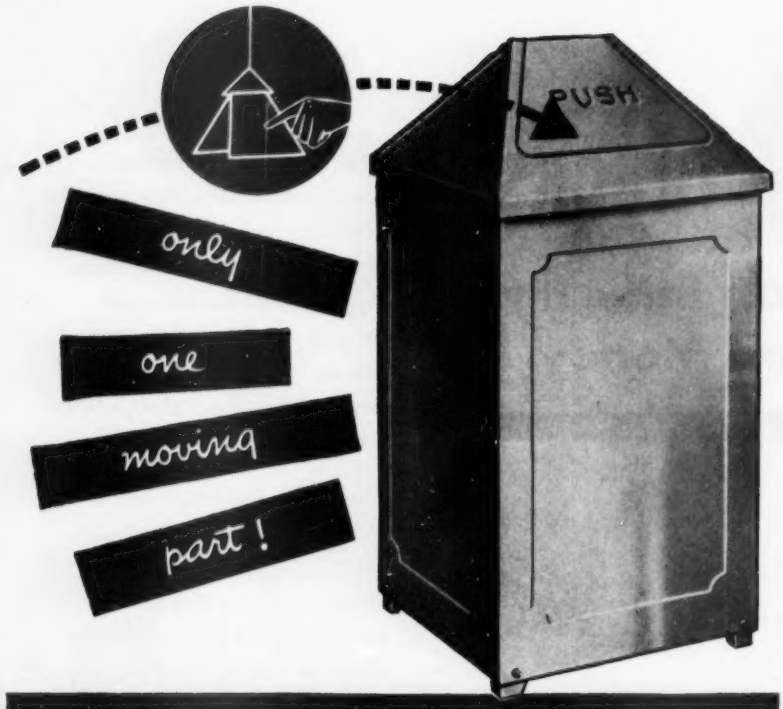

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SOLAR-STURGES Mfg. Div.
Pressed Steel Car Company, Inc., Melrose Park, Illinois

MERIT RATING

Begins on page 310

In favor of merit rating

2 financial and 1 utility
90% of 3537 employees
12 non-union manufacturing
70% of 8108 employees
10 union manufacturing
75% of 3632 employees
Total, 25 companies
76% of 15,277 employees

To put these figures in different —and more dramatic—form, we can say that in a typical plant this is the picture:

There are 611 workers in the typical plant. Of these, 462 favor merit rating over seniority as the basis for promotions and pay increases!

Of the 25 companies in our sample, there is only one (a baking company in New Jersey) where the percentage in favor of merit rating falls below 50%. There the figure was 49%.

Despite these results, union contracts—especially those of large national unions—commonly stress seniority as a basis of promotion. And pay schedules in such contracts are normally predicated on the passage of time. Even where contracts call for some such phraseology as "merit and seniority," union leaders have almost uniformly opposed systematic merit rating.

The fact that the percentage of unionized manufacturing workers favoring merit rating is even higher than that of non-unionized workers deserves attention. It could suggest that union members feel they have lost something of importance in submitting to the lockstep seniority system.

It seems that here is further evidence that union leaders have lost touch with the wishes of the rank and file. Instead of bitterly opposing merit rating, such leaders would do well to join with management in attempts to develop fair and adequate methods of merit rating—and thereby to reward ability and initiative, increase productivity, and improve living standards.

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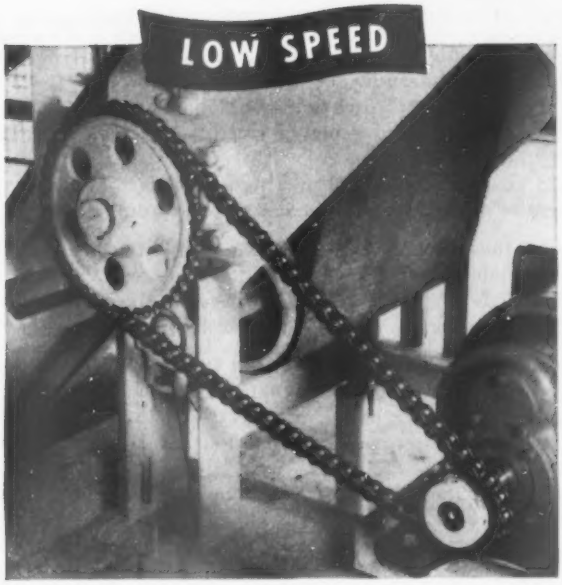

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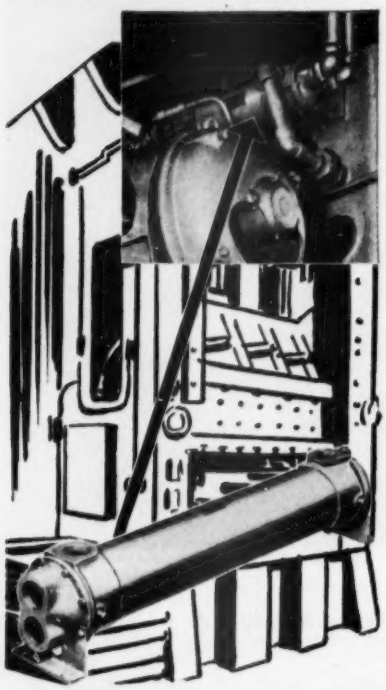

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Sales and Eng. Representatives in All Principal Cities

Test Your Reading Ability

Answer the questions below *after* you have read "Decentralization: One Cure for Production Headaches," on page 104. Then turn to page 318 for the correct answers.

1 · How many men reported to the vice president in charge of manufacturing *before* decentralization:

——a. 6 ——b. 12 ——c. 18 ——d. 24

2 · How many men reported to the vice president *after* decentralization:

——a. 6 ——b. 9 ——c. 12 ——d. 15

3 · What is the logical basis on which the company set up its plan of decentralization:

——a. Each division handles a major product line.
——b. Each division produces special parts for all product lines.
——c. Each division has its own plant building.
——d. Each division makes different models of the same product.

4 · Which *one* of the following is *not* among the benefits the company lists as the result of its new set-up:

——a. The competitive picture is the best in company history.
——b. Company has been growing steadily (up 104% in employment).
——c. Last year of reported profits highest since the war.
——d. Despite high costs, prices have increased only slightly.

5 · Which *one* of these four men is under the complete control of the Jet Division manager:

——a. Standards engineer ——c. Process engineer
——b. Design engineer ——d. Cost accountant

6 · The author speaks of five men on the Jet Division staff who have what he calls "dual citizenship." What does this mean:

——a. Division manager has administrative control over them.
——b. Division manager can tell them *how* to do their jobs, but not *what* to do.
——c. Division manager shares these men part time with other divisions.
——d. Division manager must consult vice president before giving them assignments.

7 · What happened to the cost of purchased items under the new decentralized plan:

——a. Went down ——c. Went up
——b. Stayed about the same ——d. Varied with item

8 · How did outside salesmen react to decentralized purchasing:

——a. Felt it gave them more chances to make a sale.
——b. Felt it wasted a lot of their time.
——c. Felt it reduced the amount of each sale.
——d. Felt it was unfair at first, but then changed minds.

9 · How often do key plant executives now meet with the vice president:

——a. Daily ——c. Bi-weekly
——b. Weekly ——d. Monthly

10 · What was one of the first functions to show improvement, according to the author:

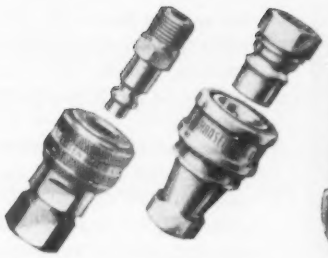
——a. Production control ——c. Methods engineering
——b. Sales ——d. Quality control

Turn the page

Meet the

HANSEN

Representative



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Furthermore—and equally important—he can often make suggestions to help you eliminate troublesome difficulties in your fluid line circuit. From years of experience in close contact with hundreds of plants, he can make practical suggestions to give you vastly improved performance from your present installation.

If you aren't already making use of his know-how, call the Hansen representative the next time you run into difficulties. He talks "shop language" which may supply exactly the information you need.

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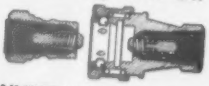

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TEST YOUR READING ABILITY

Begins on page 318

SCORING INSTRUCTIONS

Be sure to figure all three of your scores: comprehension, speed, and reading index. For a full explanation of these scores, as well as information on how to improve your scores, see "How to Read Better and Faster," on page 84 of FACTORY's October 1951 issue. If you've passed your copy along to someone else, write the Editor for a reprint.

Comprehension score: Just add up the percentage credits for each of the questions you answered correctly.

Speed score: Refer to your note of how long it took you to read the article. Convert the time into seconds. Divide the result by 10. This answer you divide in 1868 (number of words in the article). Finally, multiply this last result by 6. This will give you your reading speed in words per minute. (If you recorded your time in decimal minutes, you can get the result directly by dividing the time into 1868.)

Reading index: To find your reading index, multiply your speed in words per minute by your percentage of comprehension and divide by 100. Do not figure reading index if your comprehension score is less than 75%. With lower comprehension, the reading index is not valid.

Now check yourself against this table of reading indexes: 400 or more (excellent); 300-399 (very good); 250-299 (good); 200-249 (fair); 150-199 (poor); below 150 (very poor).

Let us know how you came out on your reading score. A post card will do — sign it or not.

ANSWERS TO TEST QUESTIONS

Q	A	Credit	Q	A	Credit
1	c	5	6	a	20
2	b	5	7	c	10
3	a	20	8	a	10
4	d	10	9	a	10
5	c	10	10	d	10

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Casters Equipped With These Conveniences Make Materials-Handling Easier, More Economical

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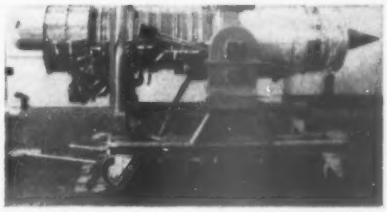
Sometimes it's desirable to keep a caster from swiveling. For such applications, there are many standard Bassick Casters which can be supplied with the easily operated plunger-type Swivel Lock. Complete flexibility in handling operations, for close quarters or long hauls.

Locking Is Sure With This Wheel Brake

In some kinds of materials-handling operations, a simple mechanism is needed to keep a wheel from turning. There's no substitute for the sure-holding action of Bassick's hand-operated Side Wing Brake.

Exclusive Sprung-Wheel "Floating-Hub" Absorbs Materials-Handling Shocks



Loads are more safely and easily moved over rough surfaces when carried in equipment rolling on Bassick "Floating-Hub" Casters.

This patented construction actually "floats" a spring-controlled caster wheel in the frame, providing mechanical resiliency between rim and axle. Even over bumps, all wheels keep in contact with the floor. Hence, load distribution is always even. That's why Bassick's "Floating-Hub" means sure protection for highly-finished auto bumpers, ceramic products, glass and china ware, loose loads of small precision parts and innumerable fragile loads.

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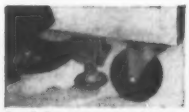
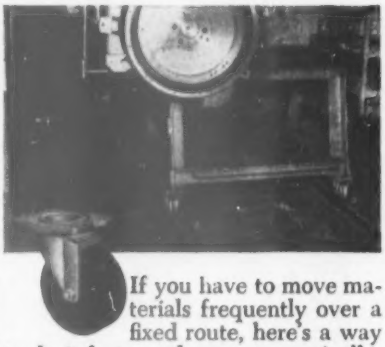


Install Bassick Position Locks on portable equipment, and you can hold it in position with an easy, downward press of the lock's foot lever. This action places almost 12 sq. in. of friction locking surface in contact with the floor. A slight upward pressure under the lock's lever releases it.

Boost Materials-Handling Efficiency With Grooved Wheels on Angle Track



If you have to move materials frequently over a fixed route, here's a way to do it faster and more economically.

Equip trucks and dollies with Bassick Grooved-Wheel Casters and move them on inverted angle iron track. By doing so, you control movement along the route with production-line efficiency, and also make movement three times easier than flat wheels in direct contact with the floor.

Angle iron track is easily installed, inexpensive, self-cleaning. Bassick Grooved-Wheel Casters operate on the track or in direct contact with the floor.

They come in 4, 6, 8, 10 in. sizes, swivel or rigid.

Write for full details — no obligation

Write us for full data on any of the products discussed here, or information on any Bassick Caster. Bassick makes the world's largest line with the sizes and types for everything you wish to move easily, quietly, efficiently. Consult your local Bassick industrial distributor for expert advice, backed by our factory engineering assistance when needed.

THE BASSICK COMPANY
Bridgeport 2, Conn.
In Canada:
Belleville, Ont.

Bassick
A DIVISION OF STEWART WARNER SW
MAKING MORE KINDS OF CASTERS... MAKING CASTERS DO MORE

EXIT THE SHOVEL...

ENTER THE Hapman

Sealed-pin Chain, Neoprene-flighted

TUBULAR CONVEYOR

for low-cost handling of bulk flowable materials—wet or dry

"Shovel labor" costs *plenty* — so do safety hazards and confusion caused by heavy aisle traffic. But there's a better way — the *Hapman Way!*

By handling innumerable bulk materials with Hapman Tubular Conveyors, you can slash these costs — and increase safety and efficiency! Can you handle metal chips from machine tools? *Yes!* Flour? *Yes!* Abrasive or corrosive chemicals? *Yes!*

Get details NOW — write Hapman, describing your problem. Ask for Bulletin FM-253.

HERE one Hapman Conveyor removes dry cast iron chips from the bases of two profile milling machines. Engineered for International Harvester's Truck Engine Plant, Indianapolis, it operates *without transfer points* in two planes, two directions! Many other conveyor layouts possible.

Hapman CONVEYORS, INC.

DIVISION HAPMAN-DUTTON COMPANY

KALAMAZOO MICHIGAN

BETTER SEEING TOOLS FOR INDUSTRY

FOSTORIA

LOCALITES INCREASE WORKERS' EFFICIENCY

Light the Vital Seeing Zone

on Machine Tools, Inspection and Assembly Benches

MODEL 3267-H-174

$6.12 EACH

in pkg. of 6
Single Units
$7.65 ea.

Overall length 32¾". Three instantly adjustable joints. Flat oblong base for machine screw mounting.

- **Rugged Construction** withstands vibration and rough handling
- **Instantly Adjustable** with flexible ball and socket joints
- **Baked Enamel Finish** — Exterior, Smooth Gray — Reflector Interior high temperature White
- **Reflector** accommodates 100 watt or any A-19 or A-21 medium screw base lamp
- **Wired Complete** with switch socket and 8 ft. oil resistant cord and moulded plug

LOCALITE fostoria for Light ON the Job

Reg. U. S. Pat. Off.

WRITE FOR COMPLETE CATALOG of Localite models with various type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO

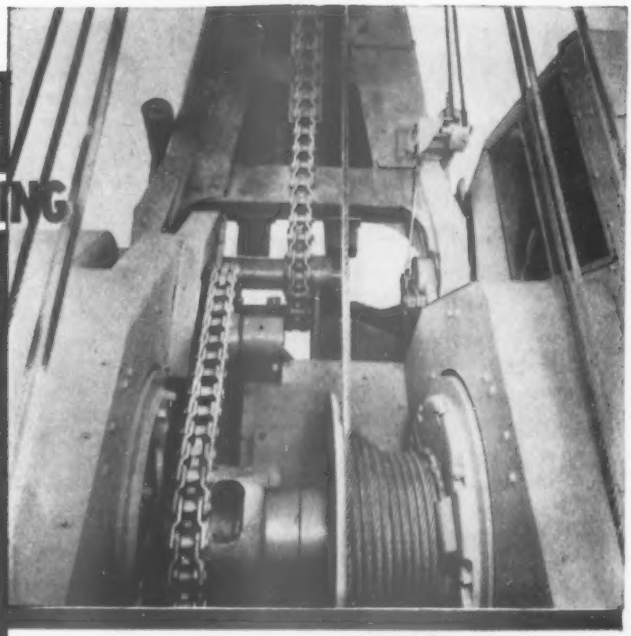
Localites are available through electrical wholesalers everywhere.

A MIRACLE? No—merely common sense. Just clamp a SERVIS RECORDER on each of your present machines. That little "watch dog" of your production schedules will act as a time clock for your machinery, recording on its chart *ALL* stops and delays, day and night. (Even down to 10-minute periods.) Thus when you can *see* it all right before your eyes, you can plan to eliminate that *down time* and thereby increase production. It's all that simple. Write today for our folder—"A BUSY PLANT." The Service Recorder Co., 1375 Euclid Ave., Cleveland 15, Ohio.

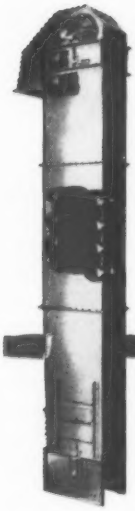
just a few Jeffrey products . . .

FOR IMPROVING HANDLING AND PROCESSING

Space does not permit a complete showing of all the products in the broad Jeffrey line. A few are displayed here to give you an idea — our NEW Catalog No. 418 goes into more detail. It will prove a handy reference if you are interested in improving handling, processing and reducing operations in your plant. Send for your copy TODAY.

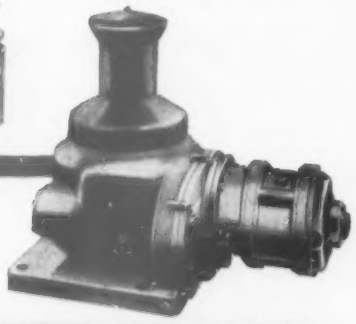


Above: A complete line of Chains and Transmission Machinery . . . bearings, idlers, traction wheels, take-ups, sprockets, gears, hub boxes, couplings, etc.

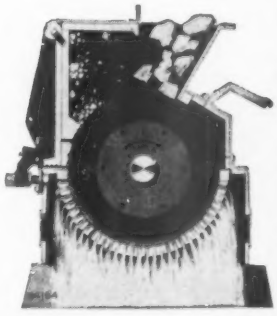


BUCKET ELEVATORS—standardized to save you time and money. A type and size, buckets mounted on belt or chain, to give your material a lift . . . to keep production moving in a way that spells more profit for you.

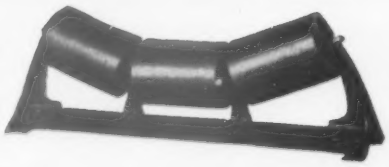
Below: Jeffrey-Traylor Barrel Packer. Cuts shipping costs—reduces size of container as well as increases its capacity. Also electric vibrating Packing Tables, Feeders, Conveyors, Dryers and Coolers.



CAR PULLERS—two sizes for moving from one to six cars. Save time and expense. No locomotive needed.



PULVERIZERS AND CRUSHERS—Rigid or swing hammer, single or double roll, FLEXTOOTH or Rotary Ring types to provide uniform reduction with a minimum of fines. Reduce coal, limestone, gypsum, pulp lap, garbage, metal turnings, alum, chips, sewage screenings, sugar cane, to desired fineness the Jeffrey way.



BELT IDLERS—furnished in both troughing and flat belt types for belt widths from 14" to 60". Idlers are of the anti-friction type, insuring low power cost and smooth performance.

JEFFREY

Material Handling, Processing and Mining Equipment

UP THE LADDER

...and DOWN

1,000-LB HOIST WEIGHS ONLY 30 LB

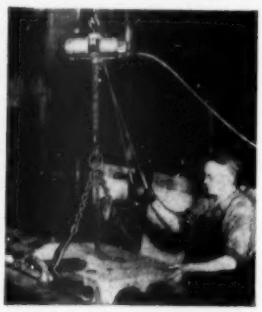
It's as easy as that to carry and hang

KELLER Air Hoist

One man handles it easily... makes replacements in minutes... avoids "down time" that might keep a whole department idle.

VARIABLE SPEED with fingertip control—spots loads accurately.

CAN'T BURN OUT from stalling. Not affected by dust and fumes. Maintenance costs are negligible!



Spotting heavy parts on a planer table

SEND FOR DETAILED INFORMATION

KELLER Pneumatic Tools

KELLER TOOL CO., GRAND HAVEN, MICH.

NEW MATERIALS

FUEL OIL CODITIONER, called Oilate, increases the thermal efficiency of all grades of fuel oils and breaks up the heavier fuel fractions that settle to the bottom of your storage tanks as sludge. And Oilate absorbs up to 40% of its own volume of water to protect tanks from rust due to condensation. American Additive Co., 7301 W. Lake St., Minneapolis 16.

CHEMALLOY welding and soldering metal for use with any aluminum or zinc-base metal or alloy is offered by Sightmaster Corp., Dept. FM, 111 Cedar St., New Rochelle, N.Y. You merely heat the metal to be welded or soldered until Chemalloy melts in contact with it. Then rub on Chemalloy. No cleaning, no flux —nothing else is needed.

DISPOSABLE PAPER SHEET, highly absorbent on one side and waterproof on the other, has been developed by The Brown-Bridge Mills, Inc., Troy, Ohio. You can use this utility sheet, called Lage Safe Mat, in your plant first aid room as a low-priced replacement for rubber sheeting or as a general-purpose wiping cloth. Water and grease resistance make it a good prospect for product packaging, too.

INDUSTRIAL CELLOPHANE TAPE, described as the tightest sticking and highest quality Scotch brand tape ever made, is announced by Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6. New tape features a more stable cellophane backing, a more aggressive adhesive, and a new surface treatment that makes it unwind easier and prevents breakage and adhesive transfer. Comes in ¼- to 6-in. widths, 72-yd. rolls.

ACID DERUSTING AND DESCALING COMPOUND for treating steels and alloy steels is offered by Ethone, Inc., 442 Elm St., New Haven, Conn. You dissolve the dry, free-flowing compound, called Ethone Descaler 2A, in water in controlled concentrations of from 4 ounces to 3 pounds per gallon. Overcomes hazards of handling strong sulphuric or hydrochloric acid.

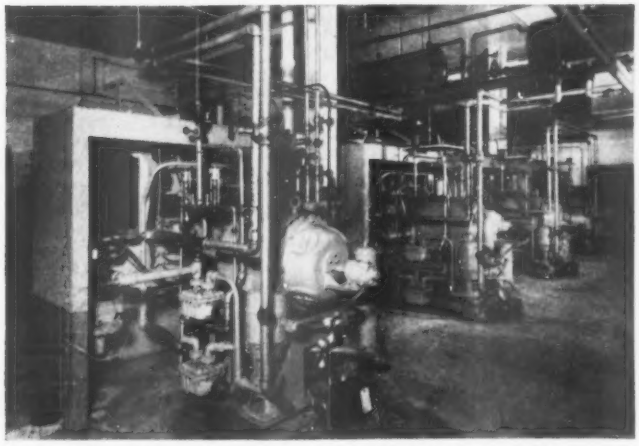
PENNSALT EC-54, an emulsion cleaner that will not boil off, evaporate, or flash at use temperatures, is introduced by Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7. EC-54 cleans non-ferrous metals without tarnishing them and will protect ferrous parts from in-plant rusting. Cleaner is an emulsified liquid that has flash point of 260F., fire point of 300F., and 95% boils within a range of 500 to 600F.

SILICONE WATER-REPELLENT COATING, named Dehydratine No. 22, contains polysiloxane resins that afford protection based on principle of negative capillarity, like the strong resistance to the passage of water offered by a capillary tube lined with a non-wettable material. You brush or spray the clear coating onto concrete, stucco, and masonry surfaces to make them effectively water repellent, while still allowing pores to "breathe." A. C. Horn Co., Inc., Long Island City 1, N.Y.

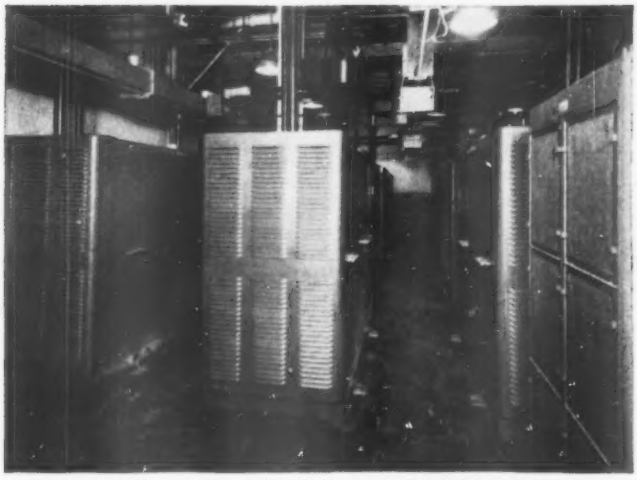
SELF-AFFIXING NEOPRENE TAPE for electrical wire and cable splicing is announced by Bishop Mfg. Corp., 62 Factory St., Cedar Grove, N.J. Called Bi-Prene, tape is said to provide a splicing medium with high oil and solvent resistance, when vulcanized, plus outstanding strength and aging qualities. Can be cured in a few minutes at temperatures not exceeding 310F. Comes in 30-ft. rolls, 0.030-in. thick, in standard widths of ½, ¾, 1, 1½, and 2 inches.

Turn the page

Obtaining flight data from the test stands. Note convenient Reliance V★S Drive controls to the right of each operator.



Adjustable-speed drive motor for each of the 25 stands is a 75-horsepower explosion-proof Reliance Heavy Duty Type 'T'.



Reliance V★S Drive control units can be placed at any convenient location. Here they have been put in a separate room.

25 JET TEST STANDS

powered by RELIANCE V★S DRIVES simulate engine flight conditions at 50,000 feet . . . .

Using 25 specially designed test stands, the Holley Carburetor Company tests fuel-flow governors under conditions similar to those they will encounter in jet engines splitting the air from sea level to 50,000 feet up. Through grueling test periods, generally in excess of 24 hours, these test stands ask a lot of their drives.

The Reliance V★S Adjustable-speed Drive . . .

1. Supplies the needed driving power despite tremendous loads caused by simulating ram and flight conditions.
2. Guarantees speed regulation of one-half of 1%—or better—within half a second.
3. Provides convenient, easy-to-operate controls.

A Reliance Electronic Regulator coordinated with each drive provides the precise speed regulation required for the success of the test. As the governor takes over regulation of the speed, the electronic regulator performs the vital function of preventing any over-run of speed as the load decreases.

The outstanding job being done on these test stands offers one more example of the versatility and flexibility of Reliance V★S Drive. For more detailed information about Reliance V★S, the original packaged all-electric adjustable-speed drive for a-c. circuits, write for Bulletin D-2311.

Sales Representatives in Principal Cities

RELIANCE V★S DRIVE

RELIANCE ELECTRIC AND ENGINEERING CO.

1070 IVANHOE ROAD, CLEVELAND 10, OHIO

Transite Pressure Pipe for your industrial water lines . . .

. . . because it reduces Pumping Costs

With Transite* Pressure Pipe, there can be no tuberculation—the internal corrosion that (1) adds resistance to flow by roughening pipe and (2) chokes off flow by decreasing diameter. As a result, this corrosion-resistant asbestos-cement pipe assures you of the full flow characteristics so essential to a dependable factory water supply.

Reduces pumping costs—Formed on a polished steel mandrel for unusual smoothness, Transite Pressure Pipe has a high flow coefficient (C=140). It not only starts high but stays high. This property of the pipe keeps pumping costs at a minimum and effects substantial savings over the years.

Minimizes pipe sizes—With corrosion-resistant Transite Pipe, water systems may be designed without allowance for flow reduction due to tuberculation. This means minimum diameter pipes may be specified, in many cases materially reducing the initial cost of a system.

Many other important savings—Transite Pressure Pipe is light in weight, easy to handle, fast and economical to install. Its easily assembled, factory-made joints stay tight in service and reduce water losses. Its high corrosion resistance—outside, inside and all the way through—assures maintenance-free performance in a wide variety of soils.

Why not find out more about this long-lasting, cost-reducing pipe? Many of its installation and operating advantages are illustrated and described in detail in booklet TR-11A. For your copy, write Johns-Manville, Box 60, New York 16, N. Y.

*Transite is a registered Johns-Manville trade mark

Johns-Manville
TRANSITE PRESSURE PIPE
for Water Supply Lines • for Fire Lines • for Process Lines

NEW MATERIALS

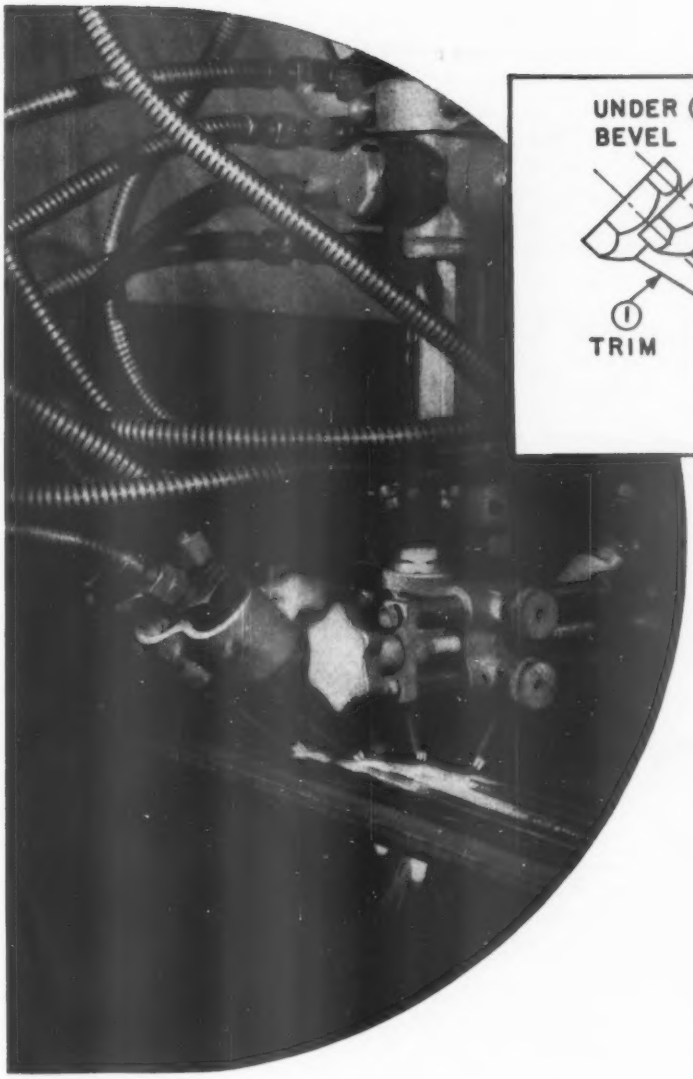
Begins on page 322

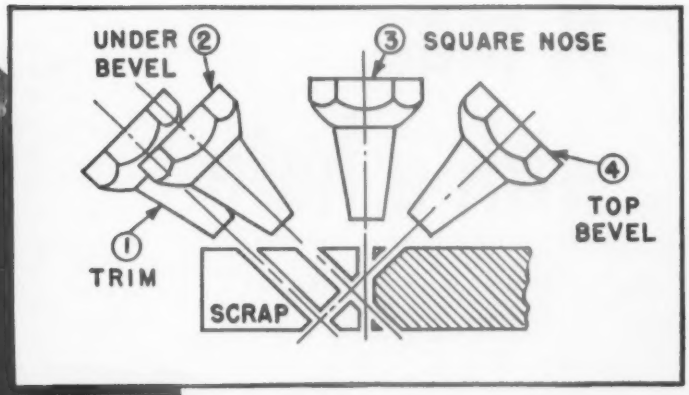
GLASS FABRIC that stretches while the yarns remain stable has been developed by Hess, Goldsmith & Co., Inc., 1400 Broadway, New York 18. Primary use of the fabric, called Form-Fab, will be as a base for reinforced plastics in the low-pressure molding of industrial products with compound curves, in place of pre-forms. Available in 0.009-, 0.012-, and 0.018-in. thicknesses.

HARD RUBBER COMPOUND that has good chemical resistance even at elevated temperatures is announced by American Hard Rubber Co., 93 Worth St., New York. The synthetic rubber, called Ace Tempron, is available in pipe and fittings, molded and hand-fabricated parts, sheet, rod, and tubes.

HOT-MELT, STRIPPABLE, PLASTIC COATINGS, called Dip-Pak No. 595 and No. 597, protect your tools, gears, and machined parts during processing, storage, and shipping. Coatings are shipped as plastic briquettes and are ready for use when you melt them in an electric or oil-jacketed melting pot. To remove Dip-Pak, you slit it with a knife and peel it off, leaving part clean and ready for use. And you can re-melt used plastic for another application.

TWO ALUMINUM ALLOYS, designated XA54S and XC56S, are announced by Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19. Especially designed for use in welded assemblies, they permit use of section thicknesses approximately one-half, or less, of other aluminum alloys commonly used for similar purposes. Both alloys are weldable by inert gas metal arc process (argon tungsten) or by the semi-automatic inert gas metal arc process. Welds are ductile and have high elongation.





One pass gets armor plate or *any* plate ready for welding

Swift-moving oxy-acetylene flames prepare steel plate edges for welding in a fraction of the time required by mechanical methods. Multiple nozzles, cutting in different planes simultaneously, slash with ease through any commercial thickness. *Just one pass to "finish" dimensions* turns out a square edge, single bevel, single bevel and nose, double bevel, double bevel and nose, or J-groove and nose. Edge preparation costs tumble; production booms.

LINDE'S oxygen-cutting methods are simple and flexible. They are economical and easy to use. They cut plates so smoothly and accurately that *no machining is necessary*—edges are ready to weld "as cut". Rigid fit-up and contour specifications are easily met. Yet, initial investment in OXWELD flame-cutting equipment is only a fraction of that for comparable machine tools. Upkeep over the years is extremely low.

On-the-job power needs are negligible. Reaction of cutting oxygen with hot steel does all the work. Only fractional horsepower is required to move the cutting nozzles along a straight line, radius, or any guided path over the line of cut.

For further details, telephone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 E. 42nd St., New York 17, N. Y. Offices in Other Principal Cities. In Canada: Dominion Oxygen Company, Limited, Toronto.

The terms "Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

Linde
Trade-Mark

Products and Processes for MAKING, CUTTING, JOINING, TREATING, AND FORMING METALS

A man with a hate

● There's no halfway feeling about fire and its resulting destruction with an expert fire protection engineer... he actually hates to see a little fire roar into a raging inferno and create a sizeable loss.

This personal sense of responsibility is inherent with C-O-TWO Fire Protection Engineers... a definite plus in your behalf. Whether its fire detecting or fire extinguishing ...portables or built-in systems... C-O-TWO means top quality backed by experienced engineering that results in operating superiority for you at all times.

With C-O-TWO Fire Protection Equipment, simplicity, practicability, longevity and minimum maintenance are built-in features that guarantee fast, positive action the instant fire strikes. Furthermore, extensive manufacturing and field installation skills, together with approvals such as the Underwriters' Laboratories, Inc., Factory Mutual Laboratories, Armed Forces and Government Bureaus assure you of the finest in modern fire protection equipment.

Rushed production periods and future expansions are some of the many problems carefully considered in a plant-wide firesafe recommendation by C-O-TWO Fire Protection Engineers... the prime objective always being the best type fire protection equipment for the particular fire hazard concerned.

WHEN BUSINESS STOPS . . . INCOME STOPS!

Don't take chances with your investment. Secure the benefits of highly efficient fire protection engineering today... our extensive experience over the years is at your disposal without obligation. Get the facts now!

C-O-TWO

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers
Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1 • NEW JERSEY

C-O-TWO FIRE EQUIPMENT OF CANADA, LTD. • TORONTO 8 • ONTARIO

Sales and Service in the Principal Cities of United States and Canada

AFFILIATED WITH PYRENE MANUFACTURING COMPANY

Lighter . . .

TOUGHER

COFFING CHALLENGER SPUR-GEAR HOIST

Never before such easy portability and rugged, shock-resisting strength in a spur-gear hoist . . . never such simplicity of design and ease of servicing.

Light Weight — carry it in one hand; set it up anywhere. One-ton model weighs only 39½ lb.

All Steel — even the housing. Takes shock loads and impact as only steel can.

Easy to Service — may be completely disassembled in minutes with ordinary tools. Simplest spur-gear hoist ever built.

Find out how this better spur-gear hoist can improve operations and save expense for you. Write for bulletin M2C

Three models, ½- and 1-ton capacities. All tested at 100 percent overload.

COFFING HOIST COMPANY

DANVILLE, ILLINOIS

Sold by distributors everywhere

Quik-Lift Electric Hoists • Hoist-Alls • Safety-Pull Ratchet Lever Hoists
Mighty-Midget Pullers • Differential Chain Hoists • Load Binders • I-Beam Trolleys

Thousands of plant executives came home from the Fourth Plant Maintenance Conference and Show with new ideas on . . .

Latest Techniques in Maintenance

VISITORS at the Fourth Plant Maintenance Conference and Show— held last month in Cleveland—saw and heard the latest. In addition to the exhibits of the newest in equipment and materials, shown by some 300 manufacturers, there were 39 sessions where experts discussed ways to provide efficient maintenance at lowest cost.

Here are highlights of some of the papers presented at these sessions.

Where to Get Expert Advice on Maintenance Problems

Walter E. Adams, Maintenance Engineer, J. M. Lehmann Co., Lyndhurst, N. J.

"Unlike the maintenance supervisors of the large plants, we in the small plants seldom have a staff of experts and specialists at our side to advise and assist us . . .

"Because of the wide diversity of our job, we cannot become specialists. Yet we must employ specialized knowledge from a broad field of engineering if we are to direct the maintenance operations successfully.

SOME WAYS TO DO IT • "How can we accomplish such a task? . . . One of the most direct methods is to make use of the many excellent services provided by the manufacturers from whom we purchase our equipment.

"More and more we find that the salesman who visits us is an experienced engineer who knows his product completely and is willing to assist us in its selection, utilization, and proper maintenance. His company can often supply us with a wealth of technical information and help, usually without cost . . .

KEEP UP WITH PUBLICATIONS • "A second path of expert assistance can be found in many of the excellent technical books and articles of leading maintenance periodicals. Liberal use of these publications cannot be too highly stressed, nor should we feel handicapped by a lack of time to read them. A good idea is to set up a technical file to keep unread articles of potential value for future reference . . .

"We can attend conferences such as the annual maintenance conference. . . . We can join or help organize plant engineering clubs in our localities.

VISIT OTHER PLANTS • "Another help can come from plant visits. We can learn much by visiting the larger plants whose greater experimental possibilities usually result in the most up-to-date maintenance methods.

"Of course, when necessary we can seek the advice of consulting experts, whose service may be obtained for a fee. . . .

INTERPRETATION IS UP TO YOU • "These, then, are our special staff of experts and specialists. But we must not be tempted to sit back and relax while we call on these modern-day genii to do our thinking.

"Keep in mind that the books we read have a general application. The magazine article often describes a specific method used in another plant that may require modification to suit our conditions.

"The sales engineer is pushing his product.

"And even the consulting expert doesn't know our plant as well as we do. . . .

"So we must interpret . . . we must judge . . . and we must guide the expert to the proper analysis of our problem.

WHAT IT TAKES • "To do this does not require detailed and exact knowledge of all the engineering principles involved, but rather sound judgment and a basic understanding of fundamental engineering principles and techinques.

"When we have such ability and make proper use of our special staff of experts, we should be able to direct the operations of our department with efficiency and relative ease."

Sell Preventive Maintenance Down the Line Before You Install It

George J. Martin, Manager of Mechanical Division, National Biscuit Co., New York

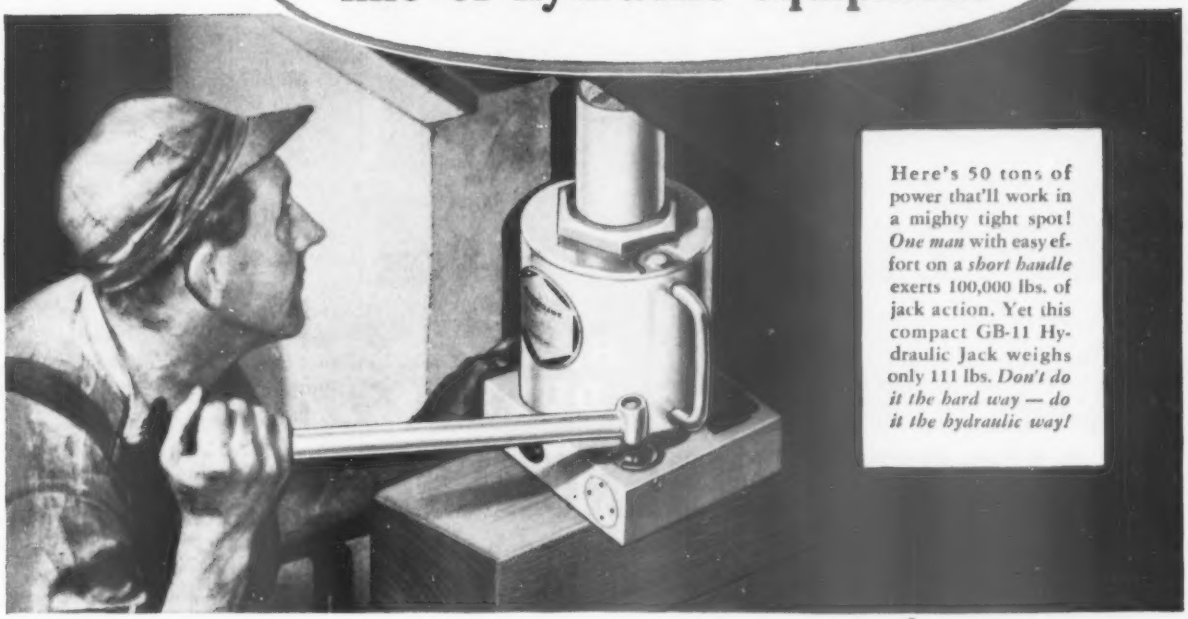
"It is the function of the plant engineer to advise management on the most economical and most efficient maintenance program. Therefore it is also his duty to sell management on the soundness and benefits of preventive maintenance. . . .

"Efforts to use preventive maintenance by selling the mechanics first and management last only encourages failure.

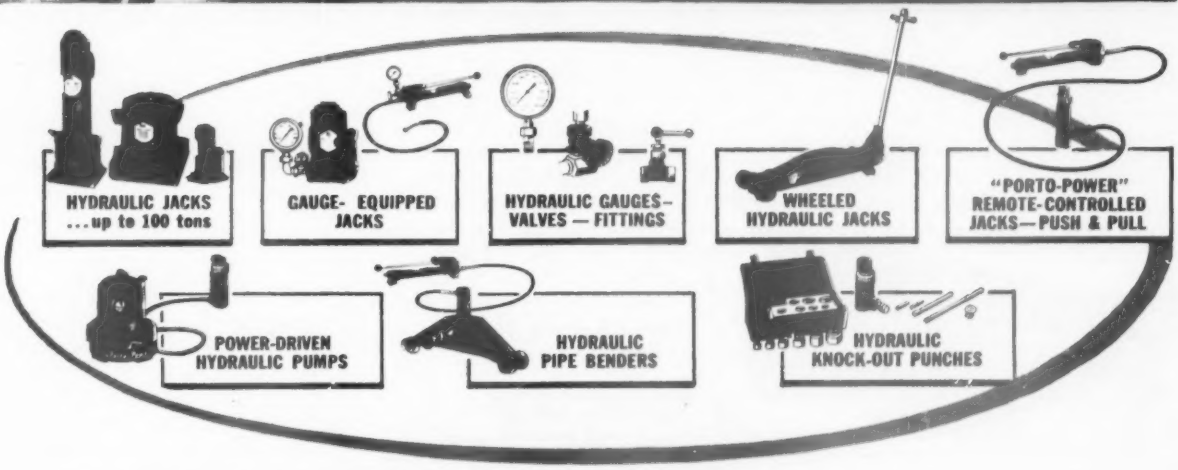
THE STEPS TO TAKE • "After management fully approves the installation of a plan for preventive maintenance, the plant engineer should make every effort to sell the program in advance to his maintenance foremen and leadmen before installing any phases in which the mechanics take part. The results and success depend upon the coordinated effort of

Pick the right jack for the job...

...from the world's most complete line of hydraulic equipment



Here's 50 tons of power that'll work in a mighty tight spot! *One man* with easy effort on a *short handle* exerts 100,000 lbs. of jack action. Yet this compact GB-11 Hydraulic Jack weighs only 111 lbs. *Don't do it the hard way — do it the hydraulic way!*



YOU GET ALL THESE HYDRAULIC TOOLS ONLY FROM BLACKHAWK

BLACKHAWK

Sold by leading distributors. Write for catalogs. Blackhawk Mfg. Co., Dept. J-2723, Milwaukee 1, Wisconsin.

make FAST work of the BIG tie-ups!

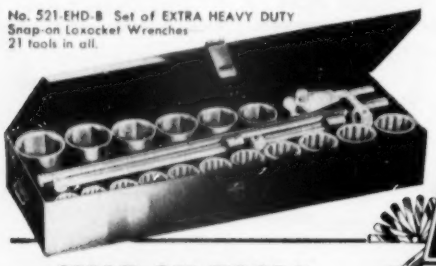
Snap-on* EXTRA HEAVY DUTY

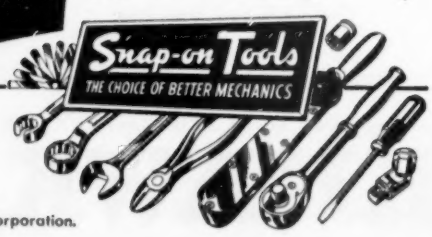
LOXOCKET WRENCHES

● Because most machine maintenance jobs begin and end with wrench work, *the better your wrenches the faster, surer, safer the job.* Above is a perfect example—no room for a ratchet head or an open-end. But a Snap-on Extra Heavy-Duty Sliding Bar and proper socket gives a man a sure grip and sweeping power.

The full Standard Set of these powerful tools, pictured below, will give your crew the *right* equipment to break loose those big, rusted-on nuts and bolts, or to tighten them up to the limit . . . with no time-wasting makeshifts. There are many more shop-proved Snap-on tools that will save money in your plant—more than 4,000 to meet the widest range of needs. Snap-on gives you close-at-hand service through factory branch warehouses in principal industrial centers. Write for the Snap-on Special Industrial Catalog and 104-page General Catalog.

No. 521-EHD-B Set of EXTRA HEAVY DUTY Snap-on Loxocket Wrenches 21 tools in all.





SNAP-ON TOOLS CORPORATION

8044-B 28th Avenue, Kenosha, Wisconsin

*Snap-on is the trademark of Snap-on Tools Corporation.

Begins on page 328

everyone down the line, from management to the mechanic. . . .

"It is also important to review the program in advance with union representatives, so that possible complaints and grievances will be forestalled.

MANAGEMENT'S JOB • "Management, at this point, should also review the entire program with the top production supervisory personnel, to acquaint them with the objectives.

"For we must recognize that the production departments are fully familiar with the manufacturing equipment and the capacity and volume they can produce under normal operating conditions. They also know the weak spots in their production set-ups. Therefore their cooperation and help are essential to assure the completeness and workability of a sound preventive maintenance program."

Planned Inspections Cut Electrical Power Outages

Robert G. Edsall, Works Electrical Engineer, Westinghouse Electric Corp., East Pittsburgh, Pa.

"Routine inspection is probably the most effective means of preventing electrical equipment from causing serious power outages and work stoppages. . . . A simple routine check at predetermined intervals is worth the expense involved. . . .

HOW WE DO IT • "All our electrical equipment is inspected, cleaned, tested, and repaired at regular intervals . . . A different plan had to be formulated before a circuit, transformer station, or feeder could be de-energized for inspection, cleaning, or repairing. We used to do this on Saturday afternoons or Sundays when our load was at a minimum or en-

Ductile, Long-Life Floors and Equipment Grout In Union Oil Company Laboratory

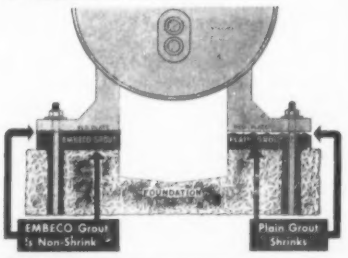
Union Oil Co. Laboratory, Brea, California. Archt.—Austin, Field and Fry; Contr.—P. J. Walker Co.; Cement Contr.—R. J. Hiller Co.—all companies of Los Angeles, California. Masterplate "Iron-Clad" Concrete Floors—non-colored and colored. Equipment grouted with Embeco Non-Shrink Mortar.

CEMENT DISPERSION IS KEY TO SUPERIORITY OF THESE MASTER BUILDERS PRODUCTS

MASTERPLATE . . .

Section of Masterplate Floor
Note Thickness of Armored Surface

EMBECO . . .



MASTERPLATE "IRON-CLAD" CONCRETE FLOORS EMBECO Non-Shrink GROUT

More and more builders and owners are taking the position that the floor and grout *are part of the machine . . .*

That is why in many carefully planned structures such as this Union Oil Co. laboratory, long-life Masterplate Floors and Embeco Grout are specified and used.

MASTERPLATE . . . produces a thick, armored surface that has 4-6 times greater wear-resistance than the best plain concrete floor. This "iron-clad" surface, produced when floor is installed or resurfaced, also makes the floor spark-resistant, non-dusting, corrosion-resistant, easy-to-clean, non-slip, economical. Non-colored and eleven colors.

EMBECO . . . counteracts shrinkage — principal cause of failure in equipment grouts. Produces easy placeability, early strength to avoid long, costly shutdowns. Provides full, level bedplate contact, plus ductility to withstand impact, vibration and pounding action.

Full information on Masterplate and Embeco and "see-for-yourself" demonstration kits supplied on request . . . without cost or obligation.

the MASTER BUILDERS Co.

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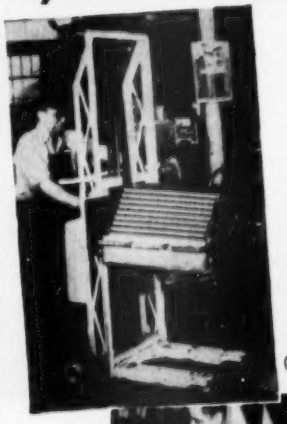
Easily
LIFT and MOVE
AWKWARD LOADS

All sorts of sizes and shapes. Weights to 750 or 1000 lbs. Lifting heights to 54", 68" or 80"

with BIG JOE Hydraulic LIFTS



BATTERY POWERED MODELS as low as $587.50 (including built-in charger)

MANUAL MODELS as low as $236.50

All models sturdily built for years of service. Powerful hydraulic assembly. Double raceway ball bearings. Self-lock 2-wheel safety brakes. Platform or adjustable forks. Finest materials handling equipment in the low price field.

Write for Specifications

BIG JOE MANUFACTURING COMPANY
900-06 W. JACKSON BLVD.
CHICAGO 7, ILLINOIS

LATEST MAINTENANCE TECHNIQUES

Begins on page 328

tirely off. But now our operating load is practically the same for seven days of the week.

"So we have set up a schedule whereby all main-line lift-type power breakers are changed during the daytime, usually between 11:30 to 12:15. This means a minimum of work stoppage. . . .

JOB PROCEDURE • "A definite procedure is followed so that all parties concerned will be notified. . . . Requests for power shutdowns are made to the production supervisor of the works engineering department, who contacts the various shop production supervisors to obtain their permission. Copies of all correspondence are given to the power plant personnel, works electrical engineer, and the maintenance department.

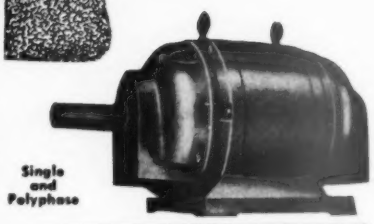
"When the plan first was put into effect, production supervisors said they could not have a power outage under any circumstance. But we won our point by showing them that an outage caused by defective equipment could stop production for a long time.

TYPICAL SHUTDOWN • "As our program now stands we get our shutdown when requested, or not later than the following week . . . When we open a circuit breaker, it is removed from its housing and a reconditioned one installed. The total outage of a main line breaker under these conditions is about 10 minutes . . .

DURING THE CHANGEOVER • "Megger readings are taken of the feeder cables to the shop load. If the reading is less than 1000 volts per megohm we immediately begin to look for trouble. A second shutdown is made, usually on Sunday. The men open the main feeder breaker and test the feeder from point to point until the defect has been located and repaired . . .

Turn the page

CUSTOM-BUILT—
NOT CUSTOM PRICED



Fully enclosed Ball Bearings; semi-enclosed construction that protects against dripping and splashing hazards and assures cool, continuous operation. Available in polyphase—from ½ to 60 hp, single phase—from ½ to 5 hp, for wide adaptability of use and greater flexibility in your power planning.

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Costs Come Down
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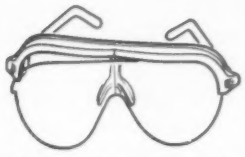
Proper protection and comfortable fit go hand in glove with Stanzoils to boost your workers' efficiency and send your company's profits soaring!

Work stoppage and injury claims decrease . . . medical expenses decline . . . employee relations improve and production increases—when you order the *right* liquid tight acid and oil resistant neoprene Stanzoil gloves for *each* job. Choice of 32 longer-lasting styles, weights, sizes, colors . . . write for PIONEER Stanzoil catalog today.

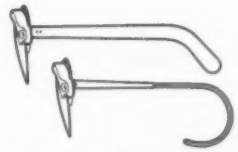
N-32 medium weight straight finger style neoprene glove. Non-slip grip surface. 10½" length.

Industrial Products Division
The PIONEER Rubber Company
222 Tiffin Road, Willard, Ohio
Quality Gloves for 33 Years

1¼ oz. BAL-spec Eye Shield



One-piece snap-in lens is extra large, affords wide field of vision, is formed to 6.00D curve. All-acetate frame is non-sparking.



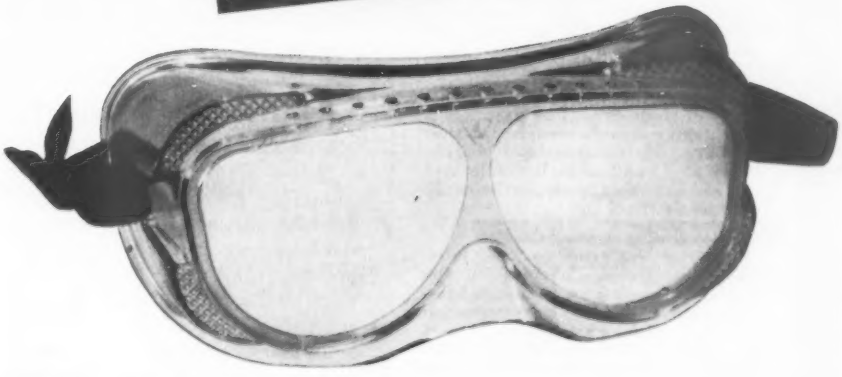
Ful-Vue temples provide unrestricted side vision, choice of flexible riding bow, or spatula which are especially liked by women because they don't muss hairdo.

1 BAL-spec All-Acetate Eye Shield

BAL-spec is especially suitable for supervisory personnel and plant visitors, and others who pass in and out of hazardous areas. Each BAL-spec Eye Shield is individually sealed in cellophane, may be repacked and sealed for re-use in polyethylene bags available from Bausch & Lomb. BAL-spec meets all U.S. Bureau of Standards tests for impact-resistance, of course.

THE 2 BEST ANSWERS
to low cost eye protection

1853/1953 INTO A NEW CENTURY OF OPTICAL PROGRESS
BAUSCH & LOMB CENTENNIAL



1¾ oz. BAL-guard Coverall

BAL-guard's unique 2-way ventilation insures a minimum of fogging. Roll-molded rims for extra comfort, extra structural support.

Crystal-clear snap-in lens is replaced in seconds. Lens area fits orbital cavity, is ideally shaped for full visual comfort.

2 BAL-guard All-Acetate Eye Shield

Here is side and frontal protection without restriction to field of vision. BAL-guard is molded to fit any average face comfortably. It may be worn over regular glasses, or corrective safety glasses. BAL-guard meets all U.S. Bureau of Standards requirements for protection against impact, guards against dust or splash. Frame available in 2 shapes—wide and narrow—in clear, transparent green or opaque brown. Snap-in lens in clear or transparent green.

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WRITE TODAY for complete specifications and prices on these two great acetate eye shields. Bausch & Lomb Optical Co., 90114 Smith St., Rochester 2, New York.

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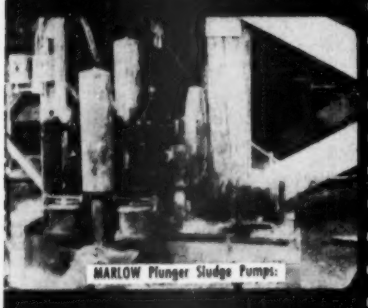
MARLOW Self-Priming Centrifugals:

MARLOW Diaphragm Pumps:


MARLOW Plunger Sludge Pumps:

MARLOW Horizontal, End Suction, Centrifugal Pumps:

are the* BEST

. . . for dependable, low-cost performance throughout industry!

Marlow Industrial Pumps are recognized as standard equipment for handling today's complex pumping problems. The Marlow industrial line is complete. Each pump is specifically designed for a particular function . . . they are job-engineered to meet specifications.

Marlows are recommended for efficiency and endorsed by industry for constant low-cost performance.

Modern Pumps for Modern Industry

MARLOW Self-Priming Centrifugals:
Automatic priming on suction lifts. Designed to handle a wide range of liquids with viscosities up to 500 S. S. U. Will not vapor lock. Close or long coupled, sizes 1½" to 10", 15 to 3,500 GPM, heads from 15 to 170 feet. Motors ¼ to 60 HP. Available for belt and gasoline engine drive.

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Built to take over the toughest kind of industrial pumping . . . for moving heavy, sluggish wastes. Gasoline, electric, or belt driven. Sizes 2, 3, and 4 inch single and 4 inch double. Capacities from 20 to 150 GPM.

MARLOW Plunger Sludge Pumps:
Rugged construction for long, hard use around-the-clock on the heaviest pumping assignments. Electric motor driven, operated with V-belt or roller chain drive. Sizes 4 to 8 inches. Capacities to 500 GPM. Special high-pressure models available.

MARLOW Horizontal, End Suction, Centrifugal Pumps:
Compact design for high-efficiency pumping of light liquids on flooded suctions. Close or long-coupled, sizes – 1" to 8". Capacity, 10 to 2,000 G.P.M. Motors ½ to 60 HP.

For more than a quarter of a century Marlow has been manufacturing pumps exclusively. When we say "Marlow means performance plus" it is based on facts and records.

Complete details available from your Marlow distributor 102

MARLOW PUMPS RIDGEWOOD, NEW JERSEY
Branch Plant: De Queen, Arkansas.
Other factories in France and England. Distributors and Dealers everywhere.

LATEST MAINTENANCE TECHNIQUES

Begins on page 328

"We have followed this procedure in many cases and saved many hours of work stoppages, as well as valuable electrical equipment, by repairing the defect before it causes trouble."

Good Maintenance Needs Good Records

M. A. Cavanaugh, Supt. of Plant Maintenance, The Budd Co., Philadelphia

"Just how far and how complex our detailed information should be [of maintenance cost] is largely determined by our own analytical abilities and our resources for compiling such cost information . . .

WHAT WE GET • "The details we now receive (through IBM facilities) tell us about five kinds of work performed. They are:

1. Installation of new parts or complete machines.
2. Repairs.
3. Fabrication of parts or complete machines.
4. Outside contract jobs.
5. Modifications to equipment.

"Labor and material costs are compiled (by equipment number and part, or location) under the following ten major headings: presses, other machinery, electrical equipment, buildings and equipment, elevators, welding equipment, conveyors, cranes, chains and materials handling equipments. . . .

HOW DATA IS USED • The maintenance staff and line supervisors use the collected data for comparative analyses, with a view to saving material and manpower, and determining the effectiveness of our maintenance effort and the suitability of particular types of equipment. . . .

"This type of record keeping is new in my company. . . . It is the beginning, however, of better controls. . . ."

Prominent Distributor tells why he prefers to sell fluorescent fixtures using CERTIFIED BALLASTS

ARTHUR N. ANIXTER, *of Englewood Electrical Supply Company*

"We prefer to sell fluorescent fixtures that use Certified Ballasts because they reduce ballast trouble and keep our customers satisfied," says Arthur N. Anixter of Englewood Electrical Supply Company, an outstanding Midwestern fixture distributor.

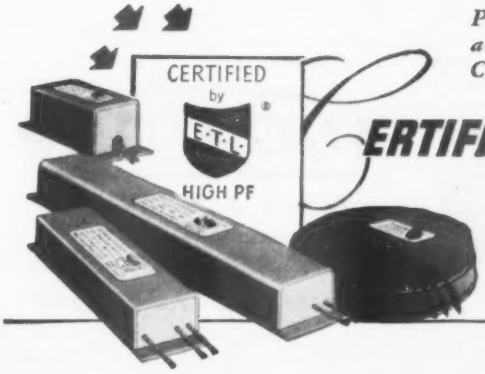
Architects, engineers, fixture manufacturers, contractors and distributors alike know that CERTIFIED BALLASTS assure—

Full Lamp Life **Rated Light Output** **Long Ballast Life**

CERTIFIED BALLASTS are made by 10 leading manufacturers to precise specifications, then tested by Electrical Testing Laboratories, Inc., which certifies they conform to these high standards.

Write for complete information on the types of CERTIFIED BALLASTS available from each participating manufacturer.

Participation in the CERTIFIED BALLAST program is open to any manufacturer who complies with the requirements of CERTIFIED BALLAST MANUFACTURERS.



CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

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Add this cost-cutting "TOUCH OF GOLD" to your carbide grinding...

A SINGLE-POINT CARBIDE TOOL is rough ground on a CRYSTOLON wheel. A typical job where these fast-cutting, cool-cutting silicon carbide wheels are proving their worth as cost-cutters.

Save your diamond wheels with Norton CRYSTOLON* wheels!

Right now, conserving your diamond wheels is not only desirable, *it is vital.*

On many carbide grinding jobs Norton CRYSTOLON (silicon carbide) wheels will give you results equally as good as diamond wheels — plus big savings. In fact, the skillful teaming of Norton CRYSTOLON wheels *with* Norton diamond wheels assures you the true, value-adding "Touch of Gold" that means carbide tools at their very best.

Where CRYSTOLON Wheels Save

In recent tests in offhand grinding of single-point carbide tools, silicon carbide wheels cost about ⅛ as much to use as diamond wheels — *per unit of carbide removed.* And a 60 grit silicon carbide wheel gave as fine a finish as a 100 grit diamond wheel!

Of course, for grinding your multi-point carbide tools and similar jobs, you'll still want Norton diamond wheels in the desired bonds and grit sizes. But for many other applications, especially roughing, it will pay you to switch to CRYSTOLON wheels. We make them in grit sizes up to 200, resinoid bonded or in the new vitrified K-Bond — which is quality-controlled to produce half-grade increments of hardness, enabling you to "pin-point" your exact specifications.

See Your Norton Distributor

for practical aid in selecting the most economical Norton wheels — CRYSTOLON abrasive or diamond abrasive — for your needs. If necessary, he'll call in your Norton Abrasive Engineer for expert consultation. Backed by the world's largest manufacturers of abrasives, these Norton team-workers are ready to help you add the product-improving, money-saving "Touch of Gold" to every grinding job you do.

Get These Up-to-the-Minute Facts

The December issue of *Grits and Grinds,* the Norton monthly magazine on grinding, contains no less than three articles on carbide tool grinding by well known Norton technicians. For valuable information on how to cut your grinding costs and improve quality, write us for your copy — also for these two helpful booklets on carbide grinding and how to make diamond wheels last longer. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

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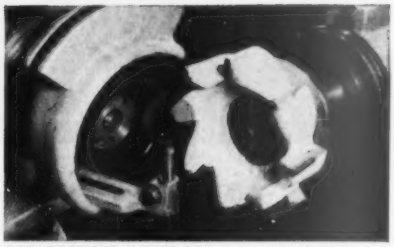


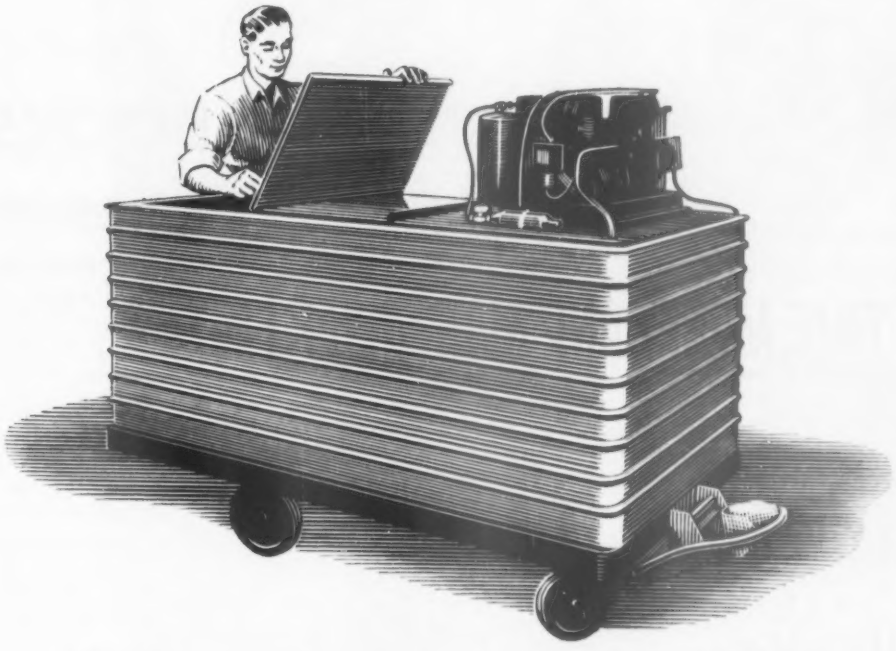
CARBIDE TIPS ON A FACE MILL get keen cutting edges on a Norton diamond wheel — the most efficient and economical wheel for multipoint tool grinding.

NORTON WHEELS FOR THE "TOUCH OF GOLD" in carbide grinding include diamond wheels in three bonds — vitrified, resinoid and metal and CRYSTOLON wheels in two bonds — vitrified and resinoid.

NORTON
ABRASIVES

Making better products to make other products better

W-1467



Refrigeration on wheels simplifies aircraft building

Can it help your business, too?

Almost every industry now makes some use of mechanical refrigeration and modern methods of air conditioning. Both facilities aid in a wide variety of production operations.

In building airplanes, for instance, various aluminum alloy parts are kept in portable, electrically operated refrigerator boxes such as that pictured above. These unique cabinets retain "as quench" conditions that exist following heat treatment of the parts. The procedure prevents warping and distortion . . . faults that would be costly to correct, as more tooling would then be needed.

Rubber and soft plastic parts requiring close tolerances are difficult to drill at room temperature. But the lower temperature created by the mobile mechanical refrigeration units readily overcomes the problem. In precision assemblies, low temperatures shrink various pieces and help make fitting easier. This prevents the galling or scoring of soft metals by elimination of drive or interference fits.

Throughout manufacturing plants in many industries, production problems of all kinds are being solved with the help of refrigeration and air conditioning. And in most of these operations the equipment used is charged with "Freon" refrigerants.

There is good reason for this. "Freon" refrigerants are entirely safe . . . nonflammable, nonexplosive, virtually nontoxic . . . and they help insure in the system a high degree of operating efficiency over maximum periods of time. Your consulting engineers will gladly recommend "Freon"-operated machines to meet your own requirements. An interesting book, "How Air Conditioning and Refrigeration Benefit Industry," will be sent on request. Write E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

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. . . THROUGH CHEMISTRY

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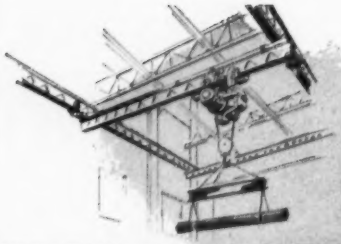
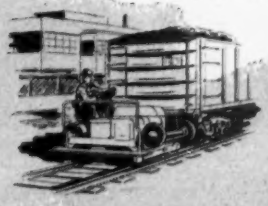
"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.



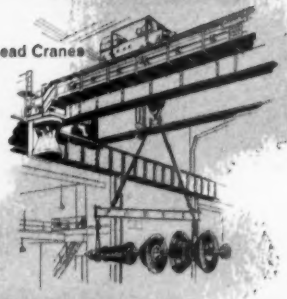
Whiting Trambeam Overhead Handling Systems

The Whiting Trackmobile



SAVE TIME, MONEY AND MANPOWER!

Whiting Overhead Cranes



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Whiting Electric Chain Hoists

The *right* equipment to do your specific handling job . . . that's *your* problem . . . and *Whiting* has the answer! Let Whiting help you decide on the *best* way to move or lift materials and products—the way that costs the least yet accomplishes more.

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By JOHN W. RIEGEL. University of Michigan Press, Ann Arbor, Mich. Charts, sample forms, demonstration interviews and counseling, selected references, index. 369 pp. $6.

This book is for the men who are responsible for the backbone of your company's future—the men responsible for the development of your managerial and technical staff.

It is based on the experiences of 50 leading companies. From conversations with executives who have grappled with the problem, Mr. Riegel gives you an outline for a fairly comprehensive program of executive development, suggests a philosophy for it, and proposes the means for carrying it out.

Although the companies that the writer visited had not followed any common pattern in starting to aid executive development systematically, he has evaluated experiences that were similiar enough for classification.

The author's "executive" is every senior and junior supervisor in every division of a business, and those persons who are not strictly executives but who are in important technical and staff positions that are difficult to fill.

Author Riegel digs into every sector of the problem and comes up with a thoughtful, detailed, and readable presentation of ideas well worth your reading time.

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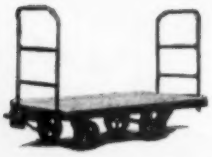
WITH THE MERCURY FORK TRUCK— TRACKLESS TRAIN SYSTEM

If your fork trucks travel over 150 feet (maximum)—you can save time . . . money . . . man power with the fork truck—"trackless train system."

In the system *trailers* do the transporting job — the fork truck loads the trailers . . . hauls the train . . . unloads and stacks at destination. And if your volume is large and distances great an electric tractor may be the best bet for the hauling job.

Let a MERCURY sales representative actually demonstrate the increase in efficiency the addition of trailers will make in your handling system. There is no obligation. Use the convenient coupon.

Mercury "Jeep" Fork Truck loads, hauls and unloads A-310 Trailers at grocery warehouse.



Model A-310 Trailer (4000 lb. capacity) with the "Safety-Self-Coupler" for "Trackless-Train-System" operation.

Mercury "Jeep" Fork Truck loads A-310 Trailer train to be hauled by a Mercury "TUG" Electric Tractor.

Over 41 years experience designing, manufacturing, installing materials handling equipment.

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BOOKS

Begins on page 338

thermal efficiency. Graphs, diagrams, equations, illustrations. By R. Royds. Chemical Publishing Co., 212 Fifth Ave., New York 10. 260 pp. $5.

HOW AM I DOING?

If you're asking that question lately, this book should help you take your bearings. Practical self-rater and direction-finder for the young, or the old-young executive. By Robert F. Moore. B. C. Forbes & Sons Publishing Co., Inc., 80 Fifth Ave., New York 11. 147 pp. $3.

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SMALL PLANT HEALTH AND MEDICAL PROGRAMS

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Turn the page

"G-E IGNITRONS GIVE US UP TO 5 FULL YEARS' SERVICE!"

Says **OLLIE PORTWOOD**
Maintenance Manager
The Huenefeld Company, Cincinnati, O.

"RECORDS prove it! Three FG-271 ignitrons we installed in 1947 have been on the job every working day since. That's several times normal tube life. Figure up the ignitron replacements we've avoided and you have some $1,000 saved on these three tubes alone!

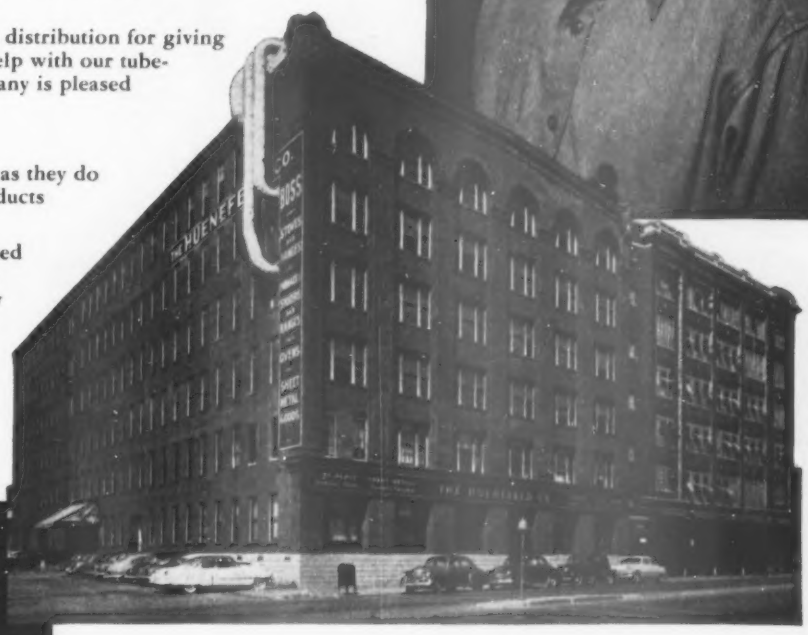
"In intermittent duty, a pair of GL-105 thyratrons have served The Huenefeld Company even longer—9 years—and still are going strong. They were installed 'way back in 1943. Also, G-E rectifier tubes we use are dependable and tough, and the same goes for phototubes and receiving types.

"We thank General Electric tube distribution for giving us fast service on deliveries, and help with our tube-maintenance problems! Our Company is pleased all the way!"

* * *

G-E tubes will save money for *you*, as they do for this large Cincinnati metal-products manufacturer!

Your G-E tube distributor—located nearby, with stocks on hand of the types you need—is waiting to show you the way to greater tube economy and efficiency. Phone him today! *Tube Department, General Electric Company, Schenectady 5, New York.*



◄ Electronic welding—spot and seam—plays a key part in the big Huenefeld Company's operations. Metal products of all types are fabricated for consumer use and for military purposes. General Electric thyratrons and ignitrons control the welding process, and their excellent life record means substantial tube-replacement sums saved. Their dependability reduces welder maintenance, helps sustain high plant production.

You can put your confidence in—

1878 75 1953 YEARS OF ELECTRICAL PROGRESS *Diamond Anniversary*

GENERAL ELECTRIC

161-181

CUTS-

GALVANIZED STEEL

and other metals

"slick as a whistle"

The "NIBBLEX" is a precision constructed "Punch and Die" unit that is used with any standard electric hand drill or other drive that takes a ¼" shaft.

At each rotation of the direct drive from the hand drill the punch bites off a little metal. (About .010" to .015".)

Cuts up to 19 ga. steel sheets, 16 ga. aluminum and other metals and materials within the thickness range.

Cuts straight lines, curves and angles from 1" radius upwards. With side cutting punch it cuts corrugated "over the hump". Faster than a hand shear. Makes metal cutting a pleasure. ORDER YOURS NOW—

Can also be used in a drill press.

For die work ask about the NORD DI-PRO-FILER

ASK FOR 10 DAY FREE TRIAL

PRICE ONLY $13.75 COMPLETE F.O.B. Denville, N.J.

EXTRA punches for corrugated $3.15 Each

Nord

INTERNATIONAL CORP.
P.O. BOX 44-F, DENVILLE, N. J.

BORSUDS HEAVY-DUTY BORAX-TYPE HAND CLEANER

BORSUDS' grime-chasing agent, borax, is completely soluble—will not clog drains. Combining borax with the finest medium and low titer neutral toilet soaps, Dolge has developed a product sure to find favor with factory and office personnel alike. Agreeable to use, gentle to the skin, quick-acting against the most ingrained grime, BORSUDS comes in convenient 5-lb packages, or in bulk for even greater economy.

Your Dolge Service Man will gladly demonstrate BORSUDS under your own shop or office conditions.

FOR FREE SANITARY SURVEY of your premises consult your DOLGE SERVICE MAN

Dependable DOLGE

WESTPORT, CONNECTICUT

For copies of books and booklets reviewed write directly to publisher listed

BOOKLETS

Begins on page 338

CENTRAL STATION PROTECTIVE SIGNALING SYSTEMS. No. 71, National Fire Protection Assn., 60 Batterymarch St., Boston 10. Standards for installation, maintenance, and use for watchman, fire alarm, and supervisory service. 24 pp. 25c.

PROPRIETARY, AUXILIARY AND LOCAL PROTECTIVE SIGNALING SYSTEMS. National Fire Protection Assn., 60 Batterymarch St., Boston 10. Standards for installation, maintenance, and use. Includes local or isolated systems for watchmen, fire alarm, and supervisory service. 31 pp. 25¢.

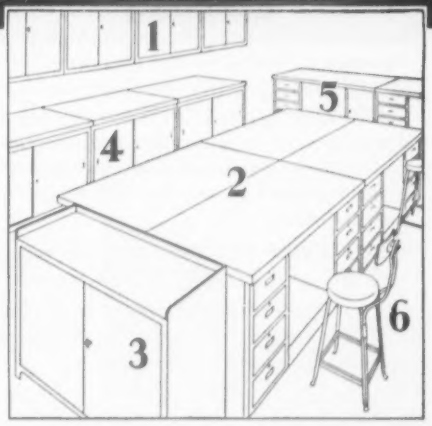
HANDBOOK ON AIR CLEANING. Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D.C. A report by the Air Cleaning Laboratory at the Harvard School of Public Health on how effective currently used air-cleaning methods are. Issued by the Atomic Energy Commission. 89 pp. 45¢.

SURFACE PREPARATION SPECIFICATIONS. Steel Structures Painting Council, 4400 Fifth Ave., Pittsburgh 13. A series of nine surface preparation specifications: solvent cleaning, hand cleaning, power-tool cleaning, flame cleaning of new steel, blast cleaning to "white" metal, commercial blast cleaning, brush-off blast cleaning, pickling, and weathering and cleaning. $1.

PRODUCTIVITY AND ECONOMIC PROGRESS. By Frederick C. Mills. Occasional Paper 38. National Bureau of Economic Research, Inc., 1819 Broadway, New York 23. A report on how the major part of national output of the United

A MODERN GAGE ROOM—CUSTOM BUILT with Standard HALLOWELL Shop Equipment

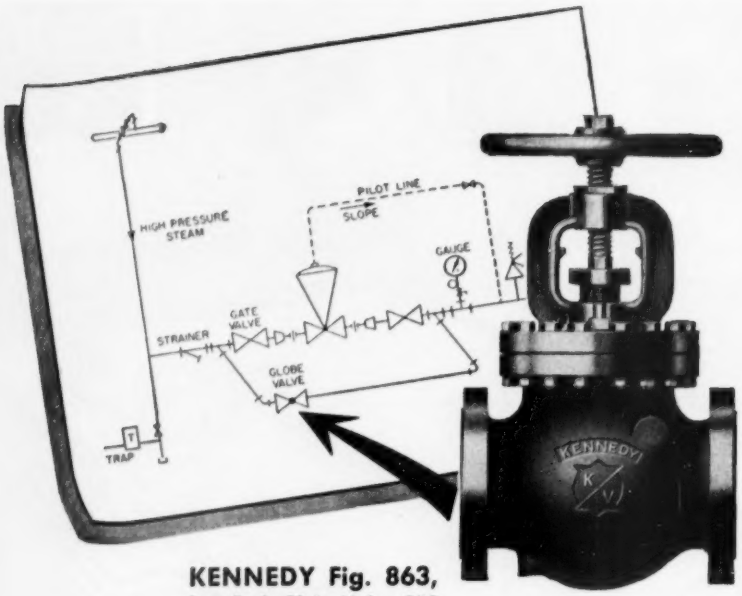
Lay it out as you want it—set it up with standard HALLOWELL Shop Equipment. It's as simple as that to custom build your gage room, laboratory, toolroom or assembly line. Let us send you complete details—then order standard ready-made units from your HALLOWELL distributor. SPS, Jenkintown 11, Pa.



1. Wall Cabinets
2. Cabinet Benches
3. Portable Tool Cabinet
4. Cabinet Benches
5. Multiple Unit Benches
6. Stools and Chairs

Our Fiftieth Year : A START FOR THE FUTURE

HALLOWELL® SHOP EQUIPMENT DIVISION SPS JENKINTOWN PENNSYLVANIA



KENNEDY Fig. 863,
Iron-Body Globe Valve. 250 pounds of steam at 500°F.

Here's how to set up pressure-reducing lines for easier maintenance

You naturally don't want to shut down a vital part of your operation when you repair a single valve.

You can avoid doing so by installing a by-pass around your pressure-reducing valve and installing a globe valve in the by-pass line. With this set-up you can use the globe valve for hand throttling when the reducing valve is removed from the line for repairs.

KENNEDY JOB-FITTED IRON-BODY GLOBE VALVES are designed and constructed for high pressures and severe service on steam or water lines and for heavy-duty service with oil, gas and other fluids that do not corrode bronze or iron.

Individual valves in the KENNEDY JOB-FITTED line are specially designed with the proper disc and seat trim to match the service for which they are recommended. Valves with either renewable composition or bronze faced discs are available, depending on the pressure in the line.

REPACK UNDER PRESSURE—You can repack ALL KENNEDY iron-body globe valves under full line pressure when wide open.

THE COMPLETE LINE of KENNEDY JOB-FITTED valves and INSPECTED fittings is sold through local distributors who are in a position to give you fast and convenient service.

THE **KENNEDY**
VALVE MFG. CO. • ELMIRA, N.Y.
Est. 1877
VALVES • PIPE FITTINGS • FIRE HYDRANTS

For copies of books and booklets reviewed write directly to publisher listed

BOOKLETS

Begins on page 338

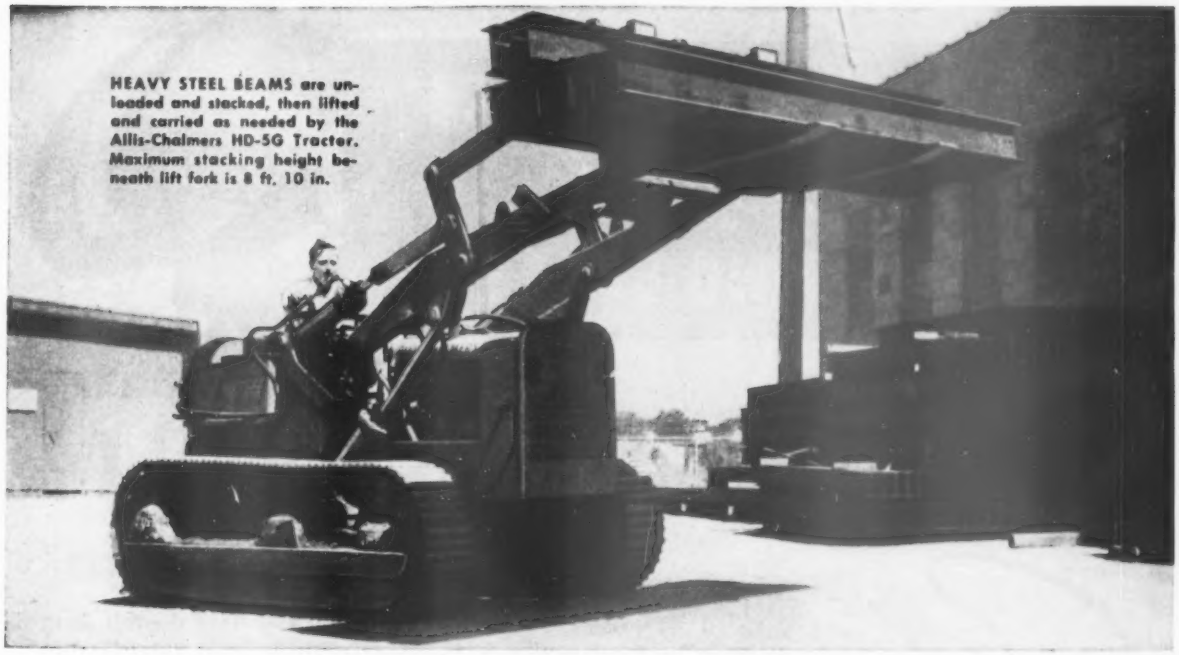
States economy above maintenance needs during the last half century was devoted to advancing consumption levels. 36 pp. 75¢.

CONVEYOR TERMS AND DEFINITIONS. Conveyor Equipment Manufacturers Assn., 1 Thomas Circle, Washington 5, D.C. A manual on standard nomenclature for conveyor types and parts. Gives you 1500 listings and illustrations of more than 80 different types of materials handling equipment. 64 pp. $1.

CAUSES OF INDUSTRIAL PEACE UNDER COLLECTIVE BARGAINING. National Planning Assn., 1606 New Hampshire Ave., N.W., Washington 9, D.C. A case study of how The Lapointe Machine Tool Co., Hudson, Mass. and Local 3536, United Steelworkers of America (CIO), achieved industrial peace and stability. Case Study No. 10 of pamphlet series. 81 pp. $1.

PLANNING THE MANAGEMENT DEVELOPMENT PROGRAM. By A. A. Pearson, manager, training dept., Ford Motor Co. Management Report No. 125. California Personnel Management Assn., 2180 Milvia St., Berkeley 4, Calif. How Ford tackled the problem. A good outline of ideas. 13 pp. $1.

AMERICAN STANDARD SAFETY CODE FOR PORTABLE WOOD LADDERS. American Standards Assn., Inc., 70 E. 45th St., New York 17. Prescribes rules and requirements for the construction, care, and use of the common types of portable wood ladders to insure safety under normal conditions of use. 18 pp. 75¢.



HEAVY STEEL BEAMS are unloaded and stacked, then lifted and carried as needed by the Allis-Chalmers HD-5G Tractor. Maximum stacking height beneath lift fork is 8 ft. 10 in.

MODERN HANDLING with A-C Tractor Shovel Helps Turn Out NEW HOME EVERY HOUR

Up in Port Washington, Wisconsin, the Houses Division of the Harnischfeger Corporation is doing its part to relieve the nation's housing shortage by building a new prefabricated home every hour. The company also is assisting the nation's defense effort by turning out hundreds of barracks for the armed forces — and doing the job fast.

Modern yard-handling methods that employ an Allis-Chalmers HD-5G Tractor and interchangeable front-mounted attachments help make this fast production possible. With lift fork the tractor moves and stacks lumber, lifts steel columns and I-beams, keeps the production line supplied with materials as needed. With shovel and dozer blade it maintains plant roadways, develops parking areas, removes ash from plant furnaces, quickly clears away snow so that there is no interruption in deliveries or yard work. The tractor has proved to be a "real multi-purpose machine," according to the plant manager.

The HD-5G is being used in developing an adjacent six-acre tract, and is also used for various jobs at a second Harnischfeger plant about four miles away. It is easily transported between plants on a low-boy trailer.

See your Allis-Chalmers dealer or write for more information on how materials handling may be speeded up around your plant with the HD-5G — or one of the three larger models with up to 175 net engine hp., 61,600 lb. weight and 4-yd. standard bucket or 7-yd. light materials bucket.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

NEW PARKING LOT IS BUILT by the HD-5G. It excavates, levels, handles all kinds of bulk materials, clears away snow with 1-yd. standard bucket or dozer blade.

LUMBER IS CARRIED into factory several tons at a time. With 40 drawbar hp. and 16,200 lb. weight, the HD-5G has both weight and power to handle big loads easily.

PARKER-KALON®

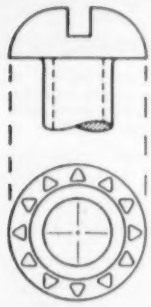
The Original SELF-TAPPING SCREWS

NOW...

Signed

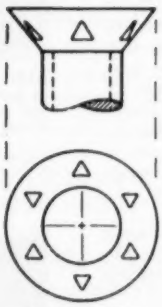
For Your Protection

NON-COUNTERSUNK HEADS



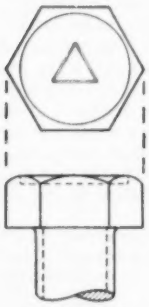
12 IMPRESSED TRIANGLES UNDER HEAD

COUNTERSUNK HEADS



6 IMPRESSED TRIANGLES UNDER HEAD

HEXAGON HEADS



1 EMBOSSED TRIANGLE ON TOP OF HEAD

IF IT'S **P-K** IT'S O.K.

TRADE MARK REG. U.S. PAT. OFF.

Signed Like the hall mark on fine silverware, this triangle mark now impressed on all P-K Self-tapping Screws signifies the maker's pride of craftsmanship. This "signature" will serve for your protection against substitution.

Certified Now, the P-K triangle mark will certify every screw that bears it as a genuine Parker-Kalon Product, made by the *originators* of Self-tapping Screws. Now, you can be sure, when you see this mark, that you are using the *only* Self-tapping Screws made with the accumulated "know-how" of 40 years of enterprising leadership.

Guaranteed Now, identification goes beyond boxes or other containers and labels. The screw identifies itself, and when you see the P-K triangle mark you know it is the *guaranteed* screw, backed by the "Guarantee of Highest Quality" printed on every box. Look for the P-K triangle on the screws you buy and use. It's your one sure way to guard against job-slowing, parts-wasting screw failure . . . the way to make *planned* assembly savings *pay off*. Parker-Kalon Corporation, 200 Varick St., New York 14.

"MIKE" NEEDS THE RIGHT LIGHT

COOLITE Glass Helps Boost Efficiency In Plant Performing Precision Defense Production

Precision-Plus is the watchword of the American Non-Gran Bronze Company, Berwyn, Pennsylvania, manufacturer of bronze bushings for Pratt & Whitney aircraft engines. This vital defense work requires extremely close tolerances—micrometer measurements in some instances down to 1/10,000 of an inch.

Coolite, Heat Absorbing, Glare Reducing Glass by Mississippi is used throughout the plant to glaze windows and skylights; since diffused, nonfatiguing daylight is a prerequisite for such precision work. Coolite glass filters out unwanted glare in natural daylight, floods all areas, including the inspection room with illumination conditioned for easier seeing. Coolite also absorbs solar heat rays, keeps plant interiors cooler, more comfortable, helps control rejects due to thermal expansion of metals.

"Coolite Glass A Sound Investment In Our Plant," says Engineering Manager

"The installation of Coolite Glass provides easier seeing and better working conditions in our plant," reports A. P. G. McGinnes, Jr., Engineering Manager, American Non-Gran Bronze Co. "It filters out annoying glare, makes working conditions more comfortable and helps to improve quantity and quality of production. Coolite has proved to be a sound investment."

SEE OUR CATALOG IN SWEET'S

Coolite has a refreshing, cool, blue-green color, modern in appearance. It reduces maintenance . . . no painted windows, makeshift shields or bothersome blinds. If you are planning new construction or modernizing existing facilities, specify Mississippi Glass to your architect or contractor. See how it can provide increased efficiency and economy for you. Get in touch with your nearby Mississippi Glass distributor today.

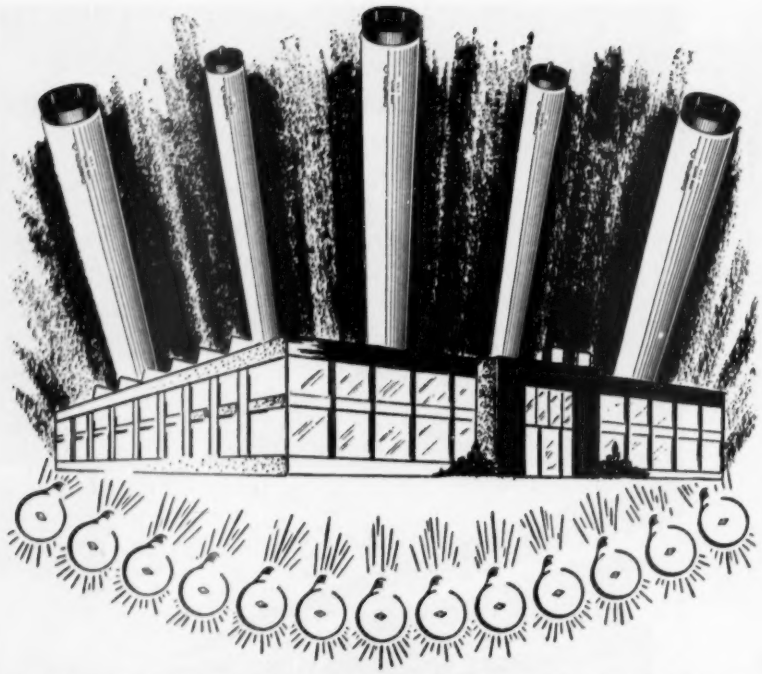
Send for free catalog, "Coolite, Heat Absorbing and Glare Reducing Glass."
Samples on request.

MISSISSIPPI Glass COMPANY

88 ANGELICA ST. SAINT LOUIS 7, MO.

NEW YORK • CHICAGO • FULLERTON, CALIF.

WORLD'S LARGEST MANUFACTURER OF ROLLED FIGURED AND WIRED GLASS



CHAMPION DIAMONDS

for Industry

Look for the CHAMPION Diamond Mark on every Fluorescent and Incandescent Lamp whatever the lighting fixture — and you can be certain of the finest and most economical light your money can buy . . . **Here's why!**

CHAMPION LAMPS
are produced, inspected and tested to meet the exacting standards of performance and long service that are expected of *industrial* equipment.

CHAMPION LAMPS
are backed by fifty-three years of experience in the manufacture of lamps for industry—all kinds—vibration service, rough service, spot, flood, etc.

CHAMPION LAMPS
offer you the services of trained lighting engineers on any special lighting or lamp problems.

CHAMPION LAMPS
are recommended and stocked by nearby electrical or industrial supply houses that can give prompt, intelligent attention to your lamp needs.

Buy the Lamp of **CHAMPION** *Value*

CHAMPION SINCE 1900

CHAMPION LAMP WORKS

Lynn, Massachusetts

A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO

INDUSTRIAL FILMS NOW AVAILABLE

"PRODUCTION PIONEERING" shows how an automotive manufacturer streamlines mass production, reduces human effort, makes the job more efficient, and improves quality. You watch one part from mine to assembly line. 15 minutes, black & white. From:

Film Library, Ford Motor Co., 3000 Schaefer Rd., Dearborn, Mich.

"PLEASE PASS THE CONDENSATE" tells how better steam trapping can give you more production from steam-heated equipment. It shows selection, application, maintenance. Color film; 20 minutes. Available free from:

Yarnall-Waring Co., Philadelphia 18.

"YOU NEVER CAN TELL" is a film on security control. You follow a naval security officer through a plant producing a classified device for the Navy. 36 minutes, black & white. Price $43.98, from:

Government Films Dept., United World Films, Inc., 1445 Park Ave., New York 29.

"AXIVANE FAN" describes manufacture, testing, and applications for vane-axial fans. 20 minutes, sound, color. Write:

Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22.

"BRICKS FROM THE SEA" traces the production of refractory brick and ramming mix. Scenes show the extraction of magnesia from seawater, manufacturing processes, and applications in production of steel, cement, copper and basic products. 30 minutes, color. Available free from:

Frank M. Cashin, general sales manager, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, Calif.

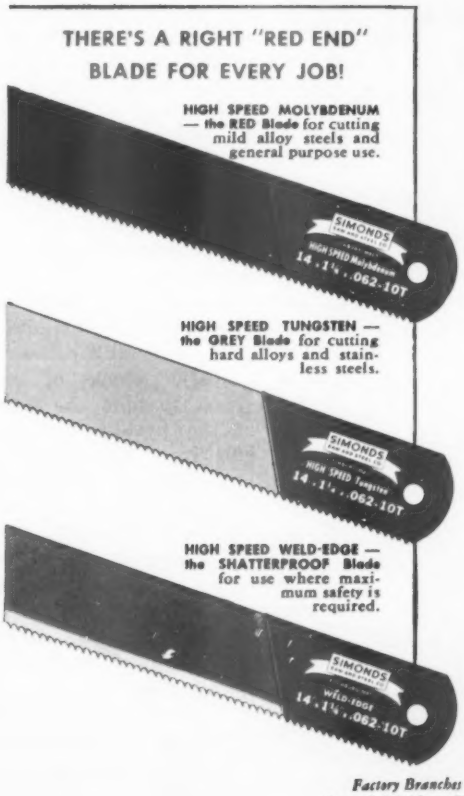
Turn the page

. . . you can count on it in every

SIMONDS

"Red End"

Power Hack Saw Blade

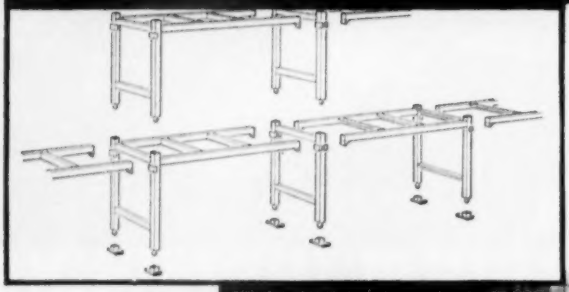

THERE'S A RIGHT "RED END"
BLADE FOR EVERY JOB!
HIGH SPEED MOLYBDENUM — the RED Blade for cutting mild alloy steels and general purpose use.
HIGH SPEED TUNGSTEN — the GREY Blade for cutting hard alloys and stainless steels.
HIGH SPEED WELD-EDGE — the SHATTERPROOF Blade for use where maximum safety is required.

It's the *plus* you get in "Red End" Blades that makes the difference in overall performance, cutting life and dependability . . . a *plus* that starts with Simonds extra tough Hack Saw Steel, poured and rolled in Simonds own steel mill . . . followed by proven know-how in milling and setting the teeth and in heat-treating for uniform hardness and toughness of every blade. A choice of three types of job-designed blades in all standard sizes is another *plus* that pays off in extra cut-ability and lower hack saw costs for you. Get delivery from stock from your Industrial Supply Distributor.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon. Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Simonds Abrasive Co., Phila., Pa. and Arvida, Que., Canada

Keep your Storage Area Flexible with MHS COLLAPSIBLE PALLET RACKS



Method of assembling a bank of MHS Collapsible Pallet Storage Racks

MHS Collapsible Pallet Storage Racks in a warehouse

You can set up MHS Collapsible Pallet Storage Racks easily and quickly anywhere in the plant or warehouse. It takes only two men and they needn't be skilled.

You can add any number of units longitudinally and one or more tiers vertically at any time.

You can move these racks from place to place without damage. They never become obsolete.

Write for prices and specifications.

Mechanical Handling Systems, Inc.

4600 NANCY AVE. • DETROIT 12, MICH.

Offices in Principal Cities

In Canada: **Canadian Mechanical Handling Systems, Ltd.**

FILM PROGRAM OF THE MONTH

Begins on page 348

HOW TO BUDGET YOUR TIME

Here's a list of films you can use to help your people budget their time better (page 84). They were especially selected for FACTORY's readers by film evaluation experts at the Audio-Visual Center, Washington State College.

"SUPERVISION-BUDGETING OF TIME AND EFFORT" presents six basic principles of planning and budgeting time for supervisors and plant superintendents. Presents examples of poor and good supervision. Stresses flexibility in the workday to take care of unforeseen developments. Shows how to plan the day so that all things to be done fit a single day's schedule. Examples shown pertain to the machine shop. A good film for management, supervisors, foremen, and office managers. 15 minutes, sound, black & white. Available free from:

Civil Aeronautics Administration, Dept. of Commerce, Office of Aviation Development, Washington, D. C.

"MINUTES ARE PENNIES" shows a rather exaggerated example of an uncoordinated office, stressing how such an operation can lose business and good will. Shows before and after scenes of the office to indicate how the correction of the problem led to greater efficiency. Good examples of coordination in other things are brought out as the manager corrects his employees. Tends to be somewhat humorous, but would be a serious problem to management. Good for management, supervisors, and workers. 20 minutes, sound, color. For rent at $3.50 from:

Photo-Art Visual Service, 844 N. Plankinton Ave., Milwaukee.

Turn the page

Effective Low Cost FLOOR MAINTENANCE AT STARTS WITH SOLVING INDIVIDUAL FLOOR PROBLEMS

The Tremco Man knows floors and flooring problems. Through sound diagnosis and thorough recommendations involving low cost, efficient methods, the Tremco Man can:

(1) HELP YOU maintain good floors in good condition
(2) HELP YOU repair existing floors that are badly worn
(3) HELP YOU improve floors in many ways—changing pitch for drainage, hardening wood or concrete surfaces, making floors water and fire resistant, making floors warm and resilient.

There's a Tremco Man near you who will inspect your floors without obligation. Whether your floor work is done by a plant crew or a contractor, the Tremco Man can be of value. He services every flooring job from start to finish.

FLOOR SPALLING AND SAFETY PROBLEMS SOLVED BY TREMCO MAN METHODS

Heavy ladles of molten metal roll safely over smooth floors at Enterprise Foundry Co., Detroit. Recommendations made by Tremco Man H. C. Black resulted in durable, resilient floors, highly resistant to spalling and pitting under heavy loads and sharp impact of falling pig iron ingots. Exposed to heavy service for over 8 years, this floor has required but a minimum of low-cost maintenance.

TREMCO

PRODUCTS AND METHODS FOR BUILDING MAINTENANCE

THE TREMCO MANUFACTURING COMPANY
Cleveland, Ohio

THE TREMCO MANUFACTURING CO. (Canada) LTD.
Leaside, Toronto, Ontario

* The Tremco Man can also help you to solve problems involving roofing and water repellence; sash maintenance; interior and exterior painting.

"We would pay a premium for these 50,000 Air Shipments yet we actually saved thousands of dollars!"

Robert S. Woolf, Mgr., Teletranscription Dept., Dumont Television Network

"When we ship TV film, we're interested in *service*. We can't afford to take any other attitude. We've bought program time all over the country, and those programs *must* be filled.

"We at Dumont use Air Express. It's the fastest. It has all-point coverage. Above all, it is DEPENDABLE.

"As to cost – Air Express costs Dumont *less* than other air services would, by thousands of dollars per year! For instance, on our regular shipments to Detroit, other services cost 37% to 337% *more* than Air Express. And we can't duplicate the service at any price!

"The Air Express people have carried upwards of 50,000 shipments for Dumont in the last four years. Their ability to trace shipments – especially when being shuttled between stations – is almost uncanny! It has helped us out in many an emergency.

"It pays to specify Air Express – in more ways than one!"

AIR EXPRESS

GETS THERE FIRST

FILM PROGRAM OF THE MONTH

Begins on page 348

"THE BALANCED JOB" is a sound filmstrip which is part of a series on supervisory relations. Shows how a foreman can efficiently plan his time so as to perform all his duties on time. Two trailers supply discussion material and review of the major points. Would be of interest to plant managers, personnel directors, supervisors, and foremen. Illustrates how to plan time so you know what you'll be doing, eliminate unnecessary and repetitive movement. 11 minutes, sound slidefilm. Available from:

National Assn. of Manufacturers, 14 W. 49 St., New York.

"A FAIR DAY'S WORK" illustrates how job standards are obtained at Procter & Gamble, also shows how a time bonus plan operates. Film consists of a lecture to prospective job and time study engineers on how to set up job standards for a fair day's work. Describes how such time factors as fatigue and personal needs are considered, stressing time budgeting. 22 minutes, sound, color. Available free from:

Procter & Gamble, Cincinnati 17, Ohio.

"STOCKROOM SAM" dramatizes the application of a job analysis and flow chart for work simplification. Compares the work of bees and grasshoppers. Shows Stockroom Sam as the grasshopper type, who runs from place to place getting nothing done. Stresses job organization and job analysis, which results in a smoother operation. Does not present high-level theories, but rather a simple story to get across its point. A humorous and entertaining film. Of interest to management, supervisors, and workers. 10 minutes, sound, color. Available free from:

Marshall Field Co., 88 Worth St., New York.

I CAN'T DRAW GOOD, SO I'M SHOWIN' YOU TH' IDEA I GOT WITH THIS SCRAP PILE STUFF!
WAIT, SEBRING-- WE MISSED SOME OF IT!
WAIT, TALK SLOW-- I WANT TO BE SURE I UNDERSTAND IT!
THEY'LL TRY TO KEEP HIM HOLDIN' THAT LIP ALL DAY FOR A JOKE -- LUCKY WE HAVE SOL-SPEEDI-DRI, OR HE'D SLIP BEFORE HE STARTED!
THE CONTINUED STORY
J.R.WILLIAMS

Sales leader—because it's value leader!

SOL·SPEEDI·DRI

You buy an oil and grease absorbent because you don't want to take chances. So don't take chances with the absorbent you buy! Use Sol-Speedi-Dri to keep your floors clean and slip-proof. It leads the field, because pound for pound, dollar for dollar, it gives you *more for your money*, all factors considered. Laboratory control keeps quality always uniform. Send coupon *today* for free Sample!

SPEEDI-DRI CORP. 218 W. Washington Sq., Philadelphia 5, Pa.

Warehouse stocks maintained in principal cities of the United States and Canada.

• • •

Enquirers in New York, New England, and New Jersey should write to Speedi-Dri Corp. Elsewhere in U.S. to Waverly Petroleum Products Co., 1724 Chestnut St., Phila. 3, Pa. In Canada, G. H. Wood & Company Ltd., Toronto. Branches throughout Canada.

FREE SAMPLE Fill out the coupon and mail today for free sample and literature.

*Name*_____

*Address*_____

*City*_____ *State*_____

Here's How
THE SHERWIN-WILLIAMS CO.
1...Saved the cost of expensive floor reinforcement.
2...Stopped vibration-caused structural damage.

This 36" x 50" belt driven horizontal centrifuge on the 3rd floor of the Sherwin-Williams' linseed oil mill in Cleveland is mounted directly on four Korfund type SK Steel Spring Vibro-Isolators. Adjustable checks in these isolators resist belt pull and make a structural base unnecessary — for the simplest installation.

...by controlling vibration

This centrifuge was installed on the 10" thick reinforced concrete 3rd floor in which there was a large rectangular opening directly under the centrifuge for gravity discharge of clarified oil down through the plant. Because of continuous use, with a minimum of time available for cleaning and balancing, vibration from the centrifuge actually cracked the floor.

Sherwin-Williams and their engineers, Osborn Engineering Co. in Cleveland called in The Korfund Co. Together they decided that there were two possible solutions: 1) reinforcement of the floor by pouring another floor over the top and tying the two floors together (expensive, and with no assurance that this would completely solve the problem); and 2) installation of Korfund isolators directly under the centrifuge, with no other changes in the installation and without any further reinforcement of the floor.

Since this centrifuge was running 24 hours a day, seven days a week, they agreed it would be worthwhile to try the isolators first.

The installation is highly satisfactory and has prevented further damage to the building —and the Korfund isolators have more than paid for themselves by eliminating the need for structural reinforcement alone.

There are standard stock Korfund isolators for the majority of installations—special designs when necessary. A selector chart in Bulletin G-104 gives recommendations for both normal and critical conditions, for pumps, compressors, centrifuges, machine tools, presses, hammers and most other processing and mechanical equipment. See Sweet's Catalog Files, or write us for your free copy today.

We'll gladly submit recommendations without obligation. Just contact us, or the Korfund representative you'll find in most principal cities. A half century of experience is at your disposal.

THE KORFUND COMPANY, INC.

KORFUND VIBRATION CONTROL — SPRINGS — RUBBER — CORK

48-35C Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

BEHIND THE BYLINE

Meet some of the men in industry who wrote acticles for this issue of FACTORY.

W. E. DEWEY (page 84) who tells you how to make use of your time, has made excellent use of his own. He's had wide experience in developing personnel and management improvement programs. Now he's a management consultant and professor.

WILLIAM D. NOA (page 98) writes about a safety indoctrination program at the Bullard Co., where he's assistant safety engineer. Formerly he was employed by Winchester Arms Co., also in the safety department.

ASA P. LOMBARD, JR., (page 98) is co-author of the safety story. He's been a safety engineer for 12 years—the first 10 for an insurance company, the past 2 for Bullard. He's recommended safety practices to Connecticut industry for many years.

Turn the page

COMMISSAR
IS ALLOWED NO CAPITALIST SECOND BREAKFAST IS LUCKY YOU ARE GETTING FIRST
IS LOOKING AT GLORIOUS HERO INSTEAD OF CLOCK
ALL WORK AND NO PLAY IS WINNING MEDAL (DULL HERO)
HERO
HERO
HERO
SAMPLE
VODKA

"Is new American cost-cutting weapon... Pure Oil Industrial Lubricants"

Pure Oil specializes in top-quality industrial oils and greases designed to do several *different* jobs—instead of one specific job.

And to do each job *equally well.*

Regardless of the type of machinery you have in your plant, our industrial engineers can nearly always help you to reduce your lubricants inventory . . . simplify your lubricating procedure . . . minimize waste and error.

Mail coupon today for free "Simplify and Save" booklet giving full details on how to start a labor-saving, money-saving, lubrication program in your plant.

Hundreds of machines . . . only one grease!

A large midwestern metal-working plant produces chrome-plated trim (hub caps, grills, etc.) for the automotive industry. All types of metal-working equipment—400-ton presses, shears, drills, lathes, roller-levelers and grinders—are used as well as huge chrome-plating machines. Yet *only one grease*—Pure Oil's POCO HT GREASE B—and one dispenser is used for *all* applications! And in 3 years there has been no down time due to lubrication failures.

THE PURE OIL PURE COMPANY, U.S.A.

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35 East Wacker Drive, Chicago 1, Illinois

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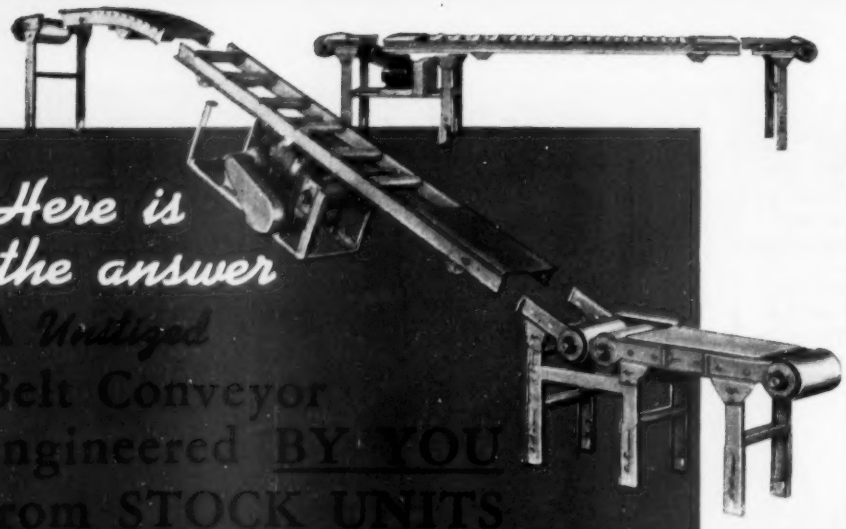
***Sales offices located in more than 500 cities, including:** Atlanta • Birmingham • Charleston • Charlotte • Chattanooga • Chicago Columbus • Indianapolis • Jacksonville • Madison • Memphis • Miami • Milwaukee • Minneapolis • Pensacola • Pittsburgh • Richmond

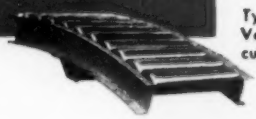


Here is the answer

A *Unitized* Belt Conveyor engineered BY YOU from STOCK UNITS

by Specialty

Ever since belt conveyors first appeared on the industrial scene, the question has been "Will the equipment fit the job? Will a conventionally designed belt conveyor meet our special requirements? Can't we, who will use the equipment, have something to say during the planning stages?" Well, here is the answer.



Type LG Vertical curve

Series "L"

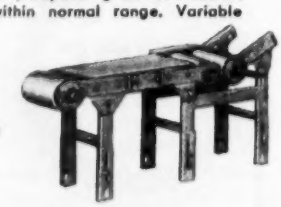
Unitized Belt Conveyors

Standard component units which YOU select to suit your specific applications. *You merely select the stock assemblies: drives, take-ups, intermediate sections in the width, length, degree of incline, load ratings, etc., to fit the job to be done.*

Series "L" belt conveyors are built for trouble-free service under average load conditions. Neoprene impregnated belting except where incline exceeds 15°, requiring rough top rubber belting. Motors: ½ to 1 H.P., depending on load factor. Speed: constant within normal range. Variable speeds available.

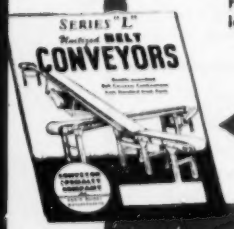
Type LD Take-up unit

Type LF Center drive and Take-up unit



Type LK Horizontal loading unit

Type LE End roll unit



JUST OFF THE PRESS . . . new literature gives specification and selection data. Shows many of the belt conveying systems that can be easily engineered from Series "L" stock units to suit your needs. Write today for Series "L" facts.

CONVEYOR

Specialty

COMPANY, INC.

• Slat Conveyors • Gravity Conveyors • Press Conveyors • "Unitable" Belt Conveyors
• Unipac Handlers (Portable Pilers) • Reciprocating Lifts • Complete Package Handling Systems

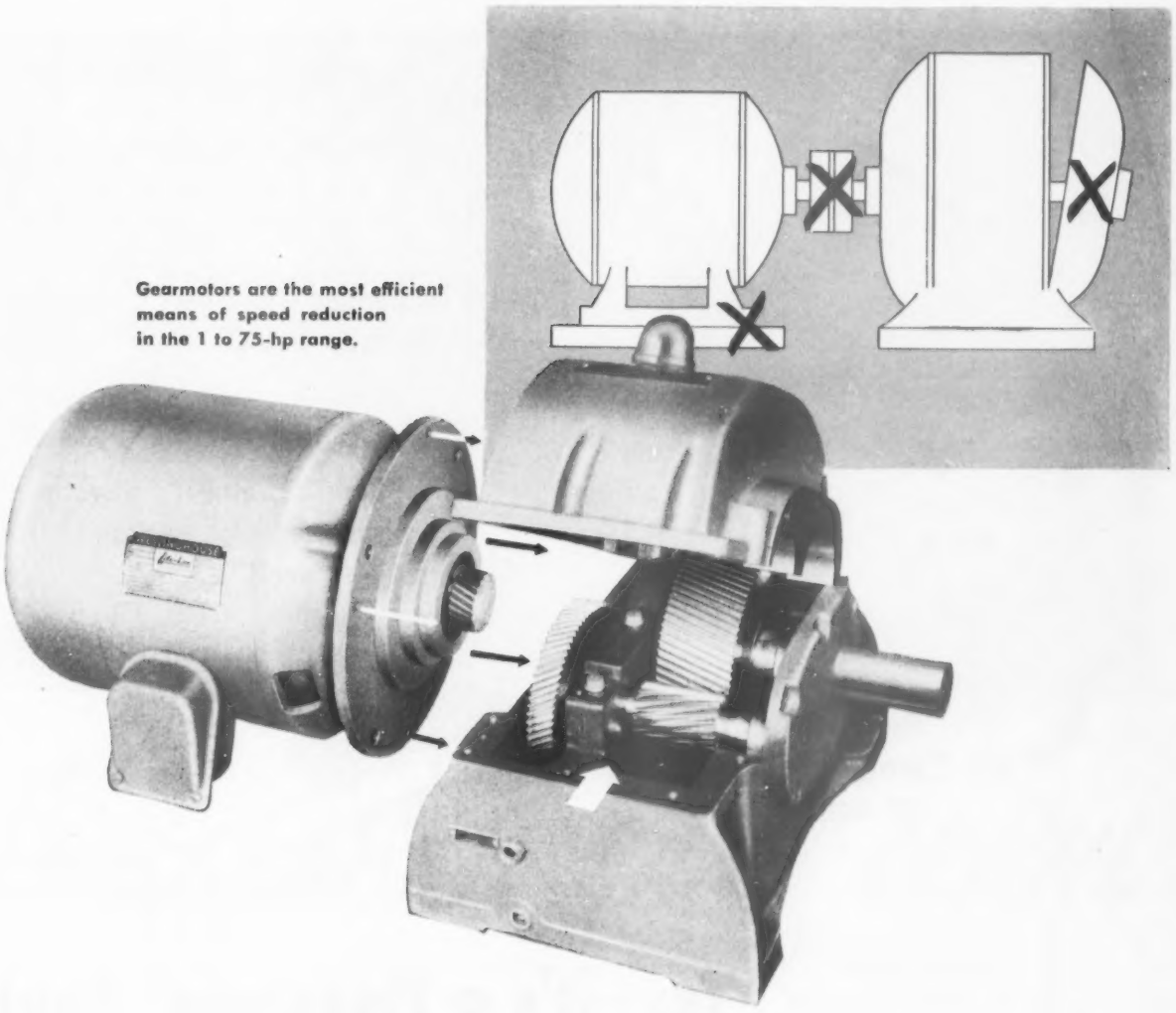
BEHIND THE BYLINE

Begins on page 354

WALTER RUPPRECHT (page 113) came to Dow in 1928 as an electrical draftsman. Five years later he was made electrical department plant superintendent. Now he's in charge of all electrical construction and maintenance at the Midland, Mich., plant.

E. A. CROSBY (page 113) began work in the motor repair department (4 men) at Dow in 1923. Today he's foreman with a crew of 11 men. He thinks the greatest improvement in motor construction is silicone insulation, helps Walter Rupprecht tell about it.

SCOTT ROGERS (page 104) worked in accounting prior to service in World War II. He resumed his industrial career in 1948, joined Parker Appliance Co. He's held varied posts—personnel to production control. Now manager of the company's jet division, he tells about reorganization.



Gearmotors are the most efficient means of speed reduction in the 1 to 75-hp range.

Here's why Life-Line GEARMOTORS stay on the job longer

LESS TIME OUT FOR SERVICING MOTOR

Removing the motor from a Life-Line gearmotor takes but a few minutes. Remove the motor mounting bolts and you are on your way—and, reassembly is just as simple and fast. Install the mounting bolts and the job's complete. No realigning of shafts—no coupling to adjust—no mounting feet to shim.

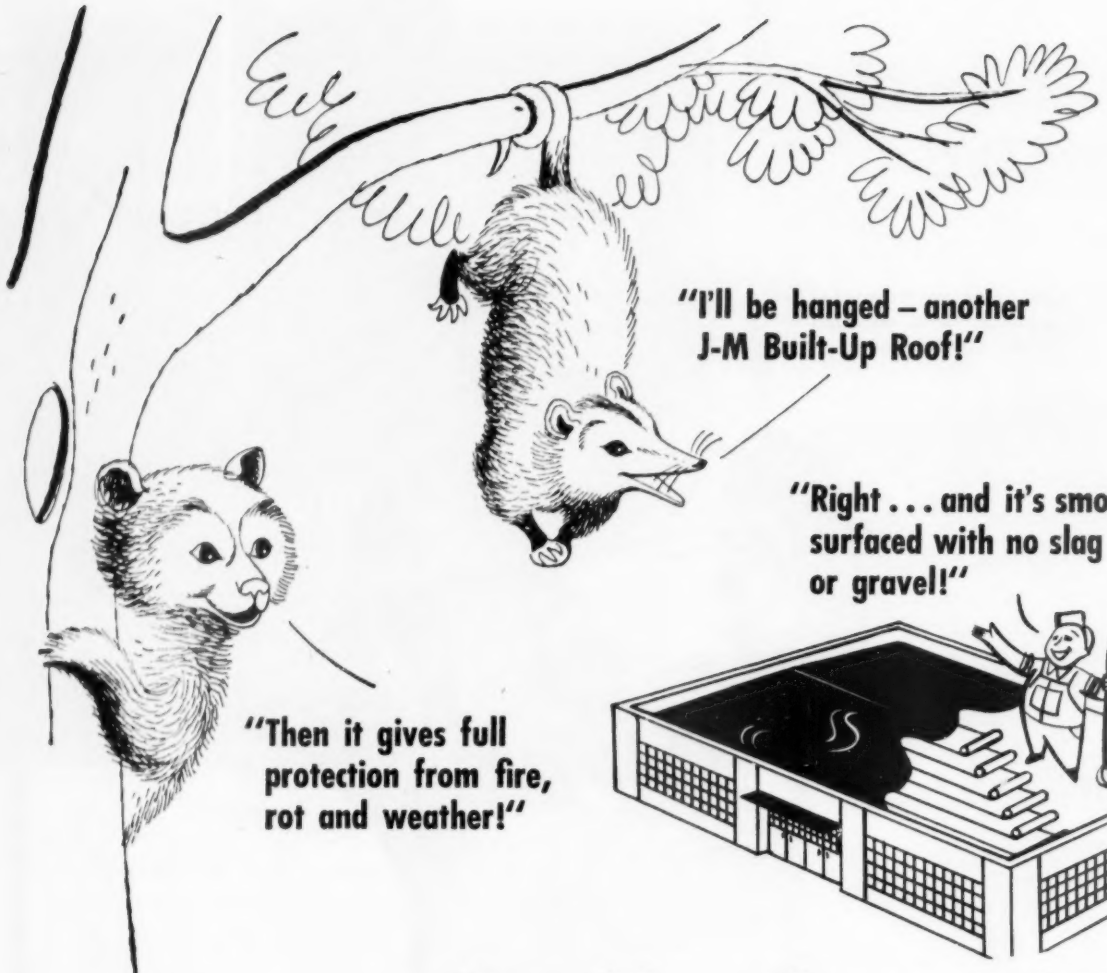
Should you be "on the spot" where down time is critical, this means that your spare motor can be quickly and easily installed. At the most, it is a simple assembly of the adapter bracket.

LESS TIME OUT FOR SERVICING GEARS

Here again, Life-Line's split case construction pays off. Simply by removing the top half of the gear case, the gears can be inspected or removed without touching the mounting bolts—without draining the oil—without disturbing the connected load.

Ask your Westinghouse representative for the details on how Life-Line gearmotors pay for themselves in production time saved. For descriptive literature, write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-07313-A

YOU CAN BE SURE...IF IT'S Westinghouse


"I'll be hanged – another J-M Built-Up Roof!"
"Right . . . and it's smooth-surfaced with no slag or gravel!"
"Then it gives full protection from fire, rot and weather!"

Yes—it's a Flexstone* Roof

Each ply is a flexible covering of stone!

● The secret of a Johns-Manville Flexstone Built-Up Roof is in the *felts*. They're made of fireproof, rotproof, weatherproof, enduring *asbestos*.

Flexstone Built-Up Roofs won't dry out from the sun . . . need no periodic coating. They're *smooth-surfaced*, too—permit thorough drainage, make any damage easy to locate and repair. They are engineered to each job . . . applied only by *J-M Approved Roofers*. J-M Asbestos felts are perforated to make application easier, give a smoother job, conform better to roof decks.

For your added protection, the Johns-Manville Asbestile* System of Flashing insures proper treatment of all critical areas. Asbestile is a heavy-bodied plastic cement designed for use with asbestos flashing felts to give thorough watertightness. As it sets, Asbestile becomes hard and forms an integral part of the wall itself.

Send for brochure BU-51A. Contains complete specifications for Flexstone Roofs and Asbestile Flashing System. Johns-Manville, Box 158, Dept. FM, N.Y. 16, N.Y.

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Made of ASBESTOS

Johns-Manville FLEXSTONE Built-Up Roofs

ASBESTOS CORRUGATED TRANSITE* • ACOUSTICAL CEILINGS

DECORATIVE FLOORS • MOVABLE WALLS • ETC.

MACHINES MOUNTED ON Westsorb CAN'T CRAWL

Westsorb *adhesive-coated* machine mounts are solving more than the problem of vibration. Their (exclusive) adhesive coating on both sides prevents looms and all other machinery from "crawling." Eliminates realignment after installation. This minimizes down time—saves money.

Westsorb adhesive-coated felt mountings don't break down under heaviest service impacts. They resist oil, acid, grease, water and age. They are simpler to install than any machine pad. No holes or bolts—no adhesive to apply. Western Felt engineers located throughout the textile areas are anxious to cooperate.

WESTSORB
Vibration-absorbing Machine Mounts

- Quickly installed
- No holes to drill
- No adhesive to apply
- Low "down-time"
- Saves floors
- Less machine repair
- Reduce plant noise
- Thickness for every need
- Engineered for every job

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MANUFACTURERS AND CUTTERS OF WOOL FELTS

Western Felt Works
4035-4117 Ogden Ave., Chicago 23, Illinois

Please send 16-page booklet containing data on efficiency tests of Westsorb machine mounts under looms and other equipment.

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Saving one company $400,000 a year

Corrugated steel sheet secured to steel plates by 3M adhesive

Diesel locomotives must work right around the clock, and the vibration encountered in their millions of operational miles makes it vital that all parts be designed to withstand plenty of punishment.

One manufacturer found that the plywood-steel side panels he was using, were deteriorating and needed frequent replacement. His design section suggested that an all-steel panel be substituted, and further study revealed that *a 3M adhesive could be utilized to hold the panel sections together.*

The new panel proved stronger, more resistant to vibration and torsional stress, and preliminary cost studies indicate that *the new style panel will save over $400,000 a year in manufacturing costs.*

See what adhesives can do for you . . .

If you're interested in making better products at lower cost, look into 3M adhesives and sealers. For more information contact your 3M representative, or write Dept. 32 for a brochure describing applications.

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giant-sized bearings
with TEAM-WORK
built-in every size
With every size in SKF's wide range of ball and roller bearings, you receive an extra quality – – *teamwork.* This is the ability of SKF field and home office Engineers, and SKF Distributors, to cooperate productively with you in putting the right bearing in the right place.
Result – – your equipment will improve in performance.
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SKF
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SKF INDUSTRIES, INC., PHILA. 32, PA. — *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.*

"Our railroad bridge is an

EYE OPENER

for anybody with an assembly problem"

"Whether you're assembling toasters or bridges," Ken went on, *"it pays to set your sights on fasteners."*

"Fasteners?" asked Jack.

"Right!" affirmed Ken. *"We've saved plenty by taking the RB&W man's advice to switch from rivets to high strength RB&W bolts in assembling high stressed structural joints.*

"These bolts stay tight and that saves us maintenance. They assemble faster, and that saves us labor and construction time."

There's a cost-cutting lesson for you in this story, whatever your industry.* So look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New inventions, like RB&W's SPIN-LOCK Screw, may prove more efficient than the fasteners you're now using.** Or you may save by the stepped-up production you get from using the finest fasteners... RB&W bolts, nuts, rivets and screws of uniform accuracy, dependability and physical properties.

Let RB&W help you make the most efficient use of fasteners on your assembly line. Address RB&W at Port Chester.

RB&W—The Complete Quality Line. Plants at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices: Philadelphia, Pittsburgh, Detroit, Chicago, Dallas, San Francisco. Sales agents: Portland, Seattle. Distributors from coast to coast.

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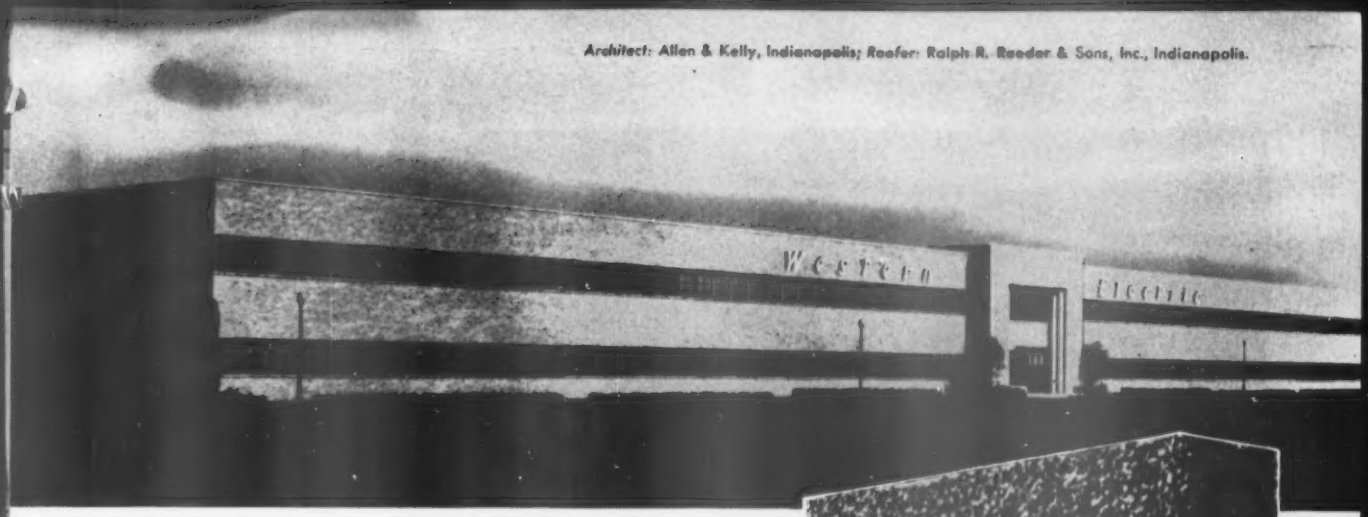
107 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

*If you're interested in construction, write RB&W at Port Chester for the free article, "No More Riveting."

**New SPIN-LOCK Catalog is in the Product Design File. Write for extra copies.



Architect: Allen & Kelly, Indianapolis; *Roofer:* Ralph R. Reeder & Sons, Inc., Indianapolis.

How *Western Electric* added overhead and saved money

Impossible? Not at all, for Western Electric Company is finding *that* a very profitable formula at their new Indianapolis telephone plant . . . the world's largest. By *adding* FOAMGLAS insulation *overhead* (on their 20 acre roof), they are *saving money* over and over.

The use of increasingly popular steel deck construction had made insulation on the roof mandatory. *Architect J. Lloyd Allen* reports, "The selection of

J. Lloyd Allen

FOAMGLAS

insulation for this roof not only cut heating and comfort conditioning costs immeasurably, but has given Western Electric the added advantage of constant insulation efficiency. Only FOAMGLAS has sealed glass cells that are impervious to the moisture that causes ordinary insulations to lose much of their effectiveness."

It will pay you also, to specify FOAMGLAS, the *Stay-Dry* insulation for *your* insulation . . . for normal temperature buildings, refrigerated structures or piping and equipment. Please use the coupon so we can send you a free sample and further information.

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- ☐ Normal Temperature Buildings
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- ☐ Send engineer to help with specific problem
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Instant Sweeping Acceptance!

The Answer to the Noise Problem in Industrial Plants

Large perforated panels of Reynolds Aluminum attractively formed and finished, backed by sound absorbing material . . . that's the basis of this new acoustical system acclaimed as the first practical way to reduce dangerous and costly noise in large plant areas. Introduced only a few months ago, and with military needs limiting supply, installations already total millions of square feet . . . including some of the biggest names in industry. Outstanding acoustical architects are now specifying it! Read the advantages summarized here. Then write for literature.

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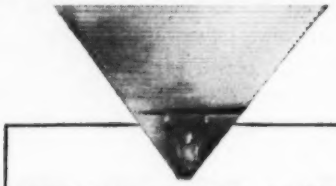

Low Cost. Low material cost; fast, labor-saving installation.

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High Sound Absorption. Up to .90 and high at all frequencies.

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Unlimited Access to utilities . . . any section movable at will.

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Low Maintenance. Rustproof, non-staining panels removable for cleaning.

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Fire Resistant. Both aluminum and sound-absorbent backing are incombustible.

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Low Weight. Completed ceiling weighs less than one-half pound per square foot.

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Modern Design. Eye-pleasing corrugations in straight-line or pattern effects.

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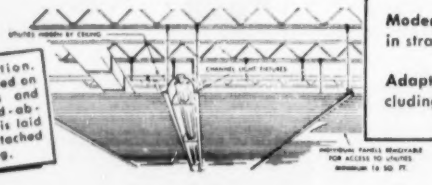
Adaptability to any air-conditioning, including plenum chamber above panels.



Typical installation. Panels are supported on aluminum angles and T-sections. Sound-absorbing material is laid on panels or attached directly to ceiling.

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COLORADO: Danco, Inc., Denver.

CONNECTICUT: Wilson Construction Co., Hartford.

DISTRICT OF COLUMBIA: T. M. Woodall, Inc., Takoma Park.

FLORIDA: Standard Insulation, Fort Lauderdale; Cliff Haller, Orlando.

GEORGIA: Lewis & Co., Atlanta.

ILLINOIS: Anning-Johnson Co., Chicago.

INDIANA: Anning-Johnson Co., Indianapolis.

IOWA: Anning-Johnson Co., Des Moines.

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MAINE: Edw. F. Byrnes Co., Portland.

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OHIO: Gellin Co., Cleveland; J. H. Archibald Co., Cincinnati.

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OREGON: Steward Griffith Co., Portland.

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TENNESSEE: Alexander Co., Memphis; John Beretta Co., Knoxville; Workman Co., Nashville.

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only AAF makes the complete line

*AAF MULTI-DUTY—the above photo shows a rear view of part of a big installation which provides clean air for testing Jet Engines. This unit, the most widely used automatic air cleaner in the world, features overlapping panel construction.

The MULTI-DUTY's positive self-cleaning principle assures continuous operation with minimum maintenance. AAF manufactures four other types of viscous filters which utilize every known method of maintenance. And remember—AAF is the only complete line.

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* MULTI-DUTY

* RENU-GLAS

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Why 5 types* of viscous air filters?

It's a good question! Since other companies only make *one* or *two* types! However the answer makes sense to engineers. AAF's five distinct types offer the needed latitude in specifying the right filter for a specific job without a compromise! Following are the five types of AAF viscous impingement filters:

- MULTI-DUTY — permanent self-cleaning, fully automatic filter with exclusive overlapping panel construction.
- M/W Unit — washable filter for heavy industrial service.
- HV Unit—high velocity washable filter with exclusive media design for commercial and industrial applications.
- RENU-*glas* — low cost filter with replaceable glass filament pads enclosed in a permanent metal frame.
- AMER-*glas*—throw away filter with fine glass filament.

Our nation-wide Sales Engineering staff is at your disposal. Please write or wire . . . no obligation of course. Fully descriptive literature is also available.

American Air Filter
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361 Central Avenue, Louisville 8, Ky.
American Air Filter of Canada, Ltd., Montreal, P. Q.

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Handy, small-package assortment of electrodes for repair and maintenance welding

7 different electrodes
(Approximately 27 lbs.)

- ★ AC-3, 1/8", 5/32", 3/16" — For all position welding of mild steels and sheet metal. AC or DC.
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- ★ Harstain, 1/8" — For spring steels and stainless steels of all kinds. AC or DC.
- ★ Nicast, 1/8" — For machinable welds on cast iron. Nicast welds are strong and non-porous.

$13.90

for complete assortment

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Maintenance Pack

Why buy seldom-used electrodes in quantities larger than you need? Now, in one convenient package, you can keep some of each type on hand economically — and get replacement packages as you need them.

The P&H Maintenance Pack equips you to do all kinds of repair and maintenance jobs with the *right* electrode. All rods are packaged to stay dry — and are clearly labeled to make selection easy.

Be ready for emergencies. Save time, trouble, money. Order a P&H Maintenance Pack from your P&H representative or local distributor. If you don't know who he is, write for his name.

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2497

DON'T BUY CAR SHAKERS

UNTIL YOU *GET THE FACTS!*

Here's the quickest, easiest method for getting stubborn loads from railroad hopper cars — Eastern Unloader's new high speed shaker.

Compare these important exclusive features and it's easy to see why Eastern outshakes them all.

Quick vertical adjustment of vibration pad assuring contact at the most effective vibrating point — the car sill — on any size car. This means greater shaking efficiency.

Speedy handwheel coupling gives Eastern fastest attaching device available on any shaker.

Complete portability lets the Eastern work from car to car in a jiffy, with a minimum of lost motion.

The Eastern Shaker is built by Eastern Unloaders, Inc., manufacturers of the famous Eastern Rotary Car Dumper and a complete line of car emptying equipment.

Get the entire story before you order. Write to Eastern today for Bulletin 101.

AND YOU'LL BUY EASTERN EVERY TIME

EASTERN UNLOADERS, INC.

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Acme Steel Strapping Insures S.A. *(Safe Arrival)*

and builds good will for Admiral Corporation

QUALITY CONTROL of Admiral television receivers extends beyond the assembly lines and into the shipping department where Acme Steel strapping is used to insure safe arrival of TV sets in the hands of distributors.

Admiral Corporation, Chicago, "world's largest manufacturer of television receivers," changed its method of shipping TV sets three years ago and 1) eliminated previously heavy damage in transit losses; 2) gained a tremendous amount of good will with its distributor organization.

Up until 1950, Admiral TV sets were placed in shipping cartons and loaded solidly into freight cars. Frequently the sensitive electronic tubes and complex wiring systems in the sets were damaged enroute to distributors.

Then Admiral called in Acme Steel shipping specialists to analyze the problem and suggest a new loading technique to cut this loss.

W. J. Curtis, traffic manager, tells what happened: "Since we started using Acme Steel strapping at our Chicago plant as a shipping safeguard three years ago, we have not had a single TV set damaged in transit which was attributable to improper loading or strapping failure."

Acme Steel strapping can insure Safe Arrival wherever secure fastening and low labor and material costs are needed. Write for details to Acme Steel Products Division, Dept. FMM 23.

ACME STEEL

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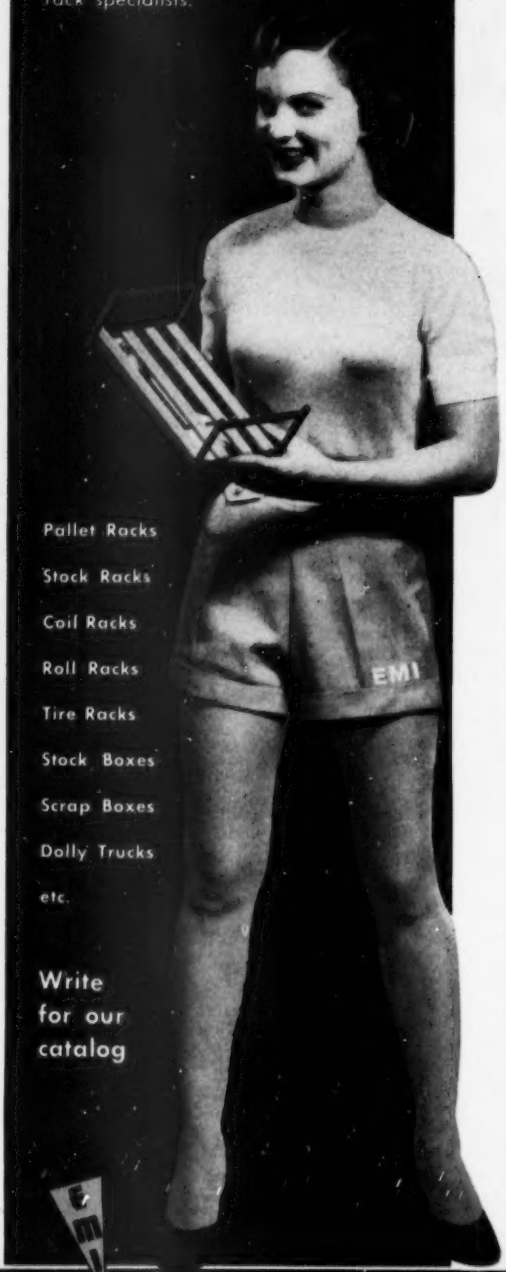

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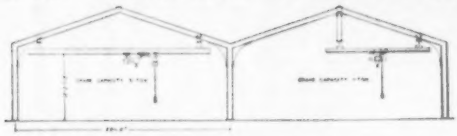

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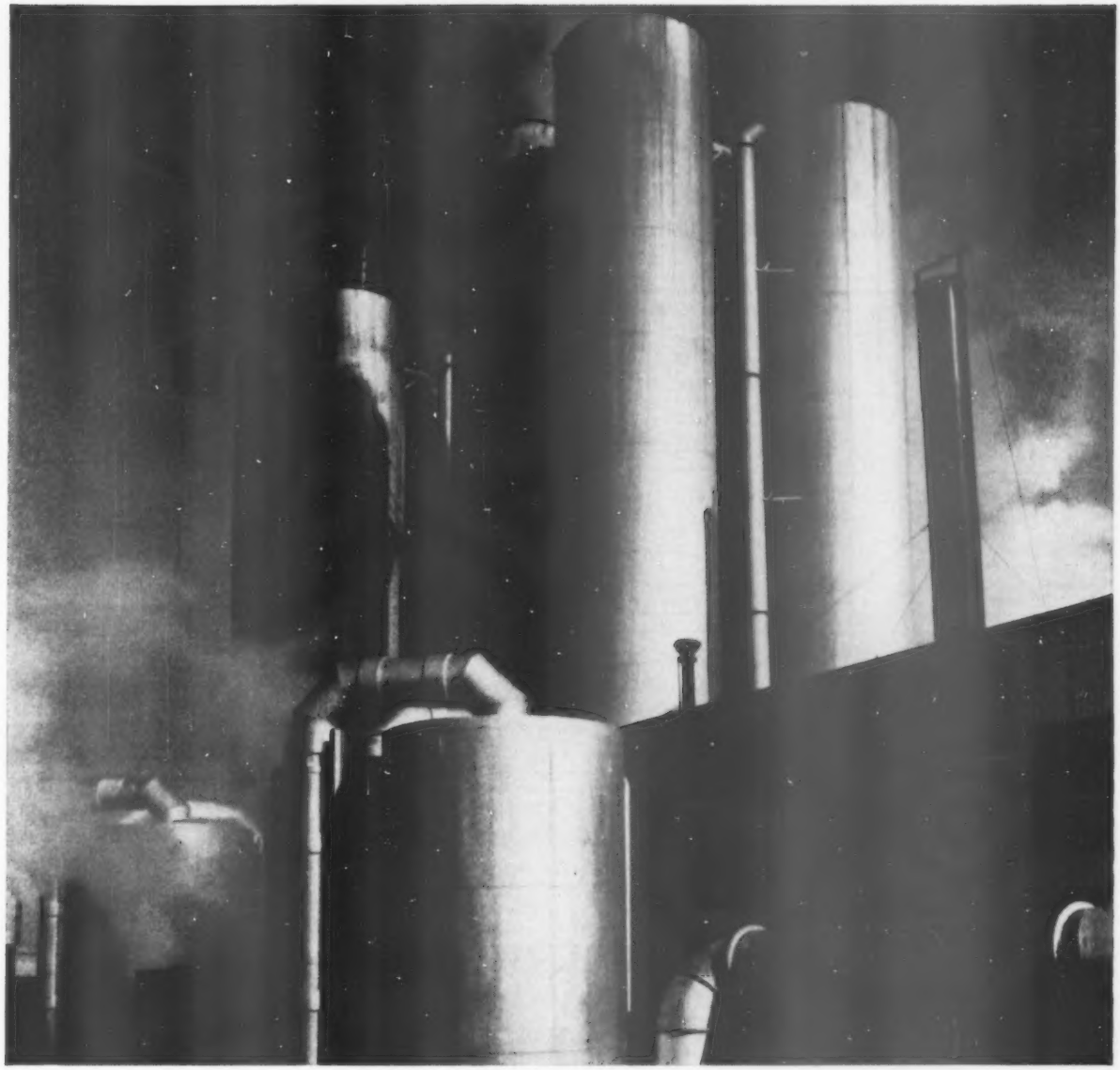

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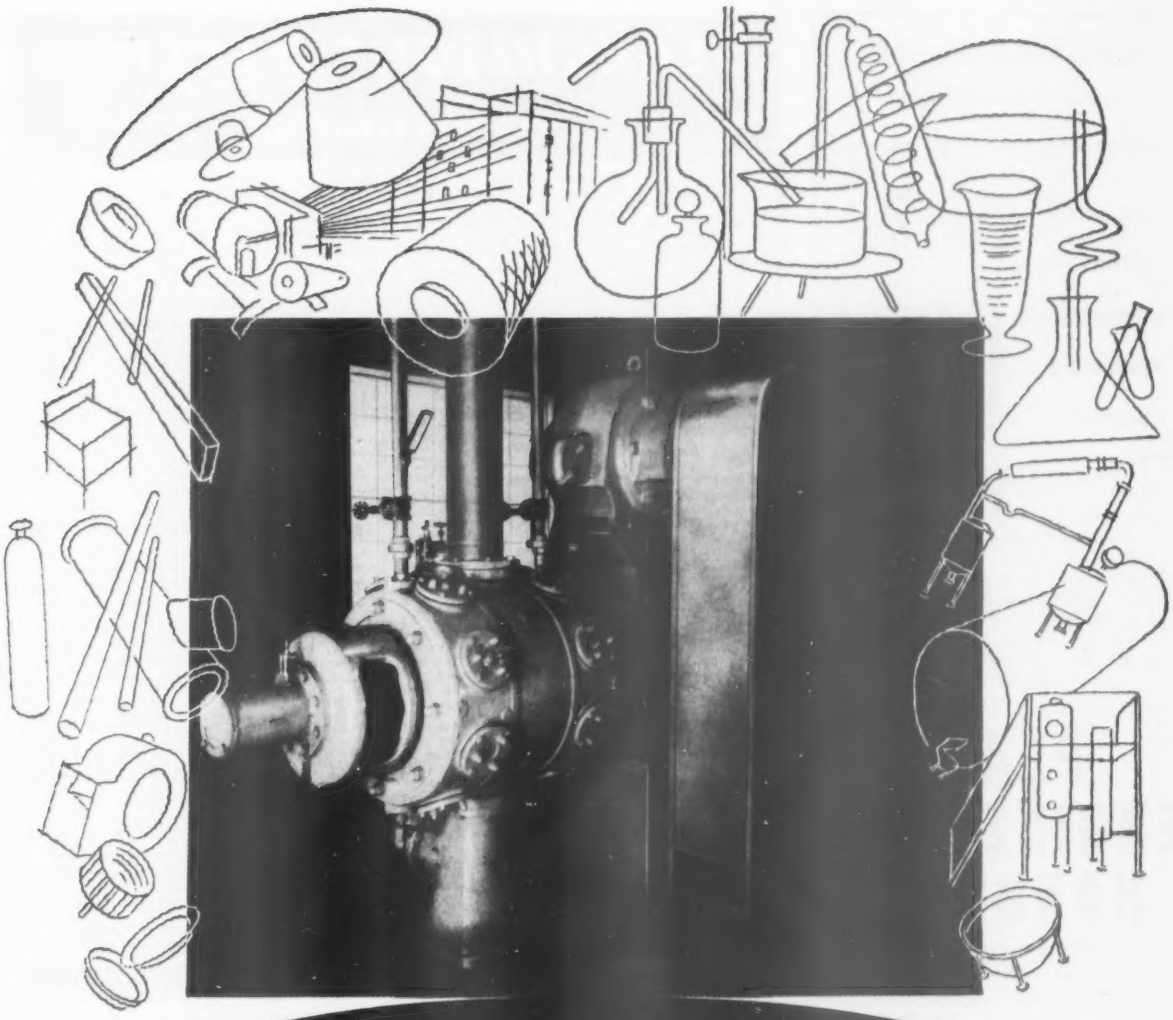

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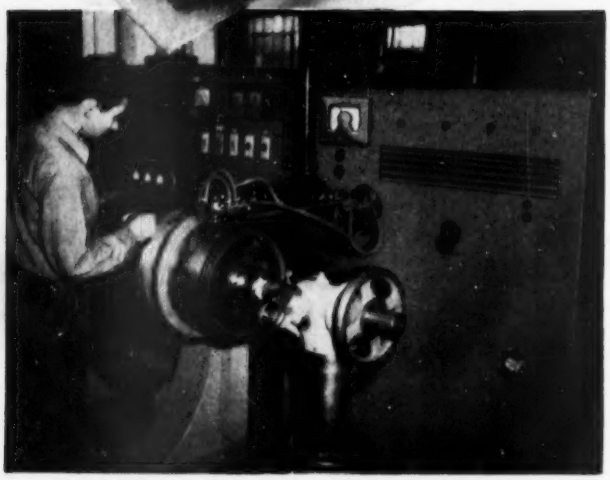

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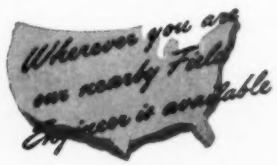

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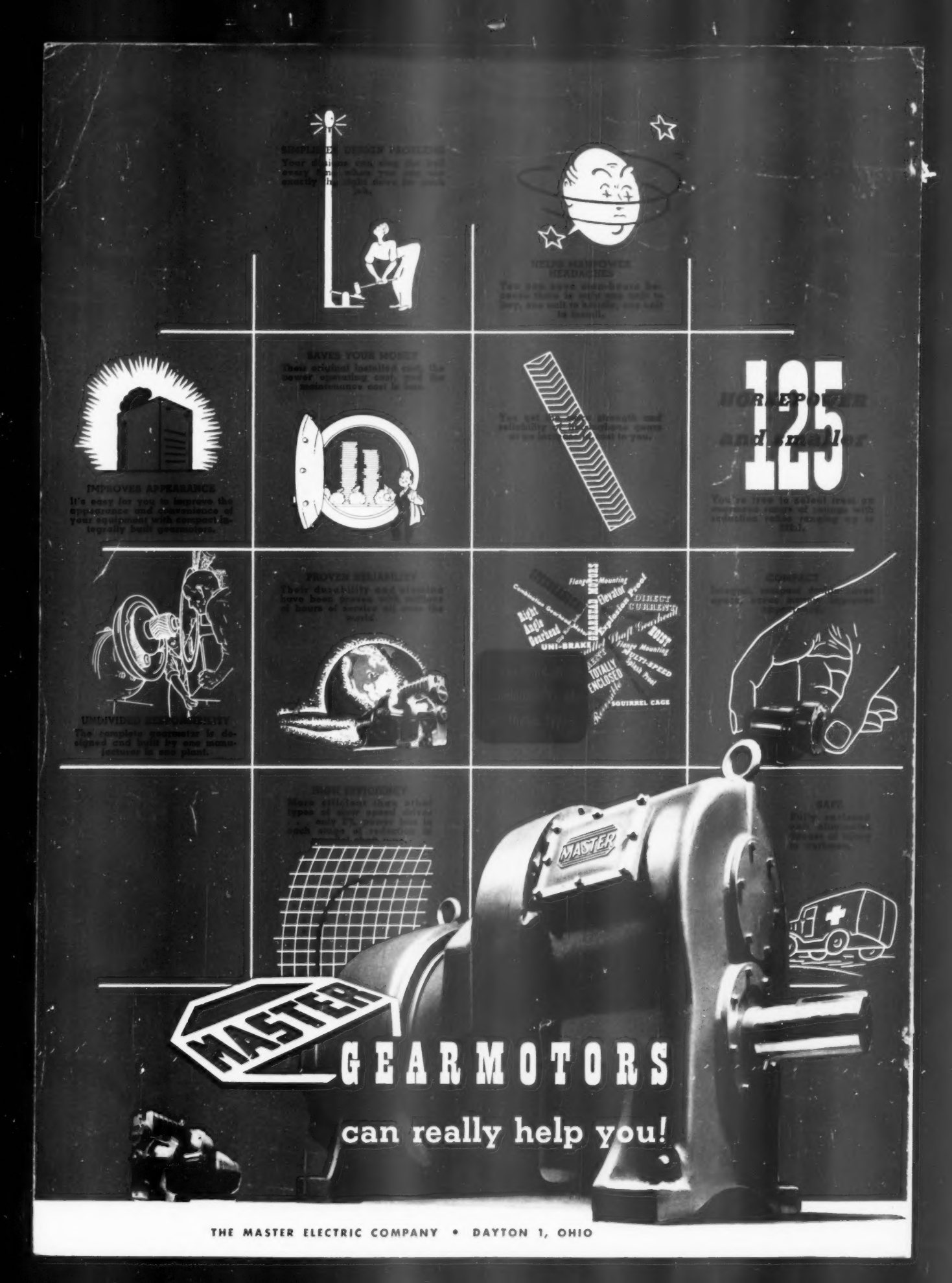

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